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User's Manual for the Systematic Organizational Design Methodology

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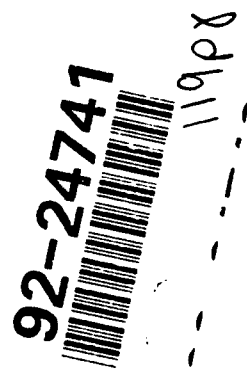
May 1992

Fort Bliss Field Unit
MANPRINT Division

U.S. Army Research Institute for the Behavioral and Social Sciences

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U.S. ARMY RESEARCH INSTITUTE

FOR THE BEHAVIORAL AND SOCIAL SCIENCES

A Field Operating Agency Under the Jurisdiction
of the Deputy Chief of Staff for Personnel

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Technical Director

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NOTICES

User's Manual for the Systematic Organizational Design Methodology

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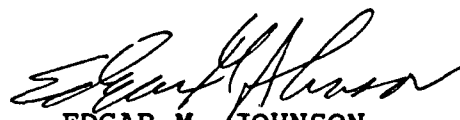| Army Project Number	Human Factors in Training and
2Q263007A793	Operational Effectiveness

The MANPRINT Division of the U.S. Army Research Institute for the Behavioral and Social Sciences (ARI) supports the Army with research and development on manpower, personnel, training, and human performance issues as they affect the development, acquisition, and operational performance of Army systems and the combat readiness and effectiveness of Army units. The impact of these behavioral and performance issues on the effectiveness of Army systems and units is in part a function of how the personnel and equipment are organized to conduct and support combat operations. The Army has identified a need to develop tools to increase the efficiency and reliability of the process of designing organizational units. The Fort Bliss Field Unit is conducting advanced development research to meet this need.

This research product is a comprehensive guide for the use of the Systematic Organizational Design (SORD) methodology, a computer-assisted tool that standardizes the process and structure for creating and documenting initial concepts for a unit's organizational design. SORD aids in the development of a document called a Unit Reference Sheet (URS) that has sufficient detail in personnel and equipment requirements and capabilities to permit its use in Army studies and cost analyses. The software also ensures a high degree of uniformity, producing a URS that is an acceptable reference for organization documenters.

SORD was developed with the encouragement of the Deputy Chief of Staff for Personnel at Headquarters, Department of the Army. The Force Design Directorate for the Combined Arms Command of the U.S. Army Training and Doctrine Command (TRADOC) was the principal proponent of the research and development effort from its inception.

The SORD process described in this user's manual was briefed to Deputy Chiefs of Staff for Combat Developments at Headquarters Training and Doctrine Command (TRADOC). Prototypes of SORD were demonstrated at the Twenty-eighth Army Operations Research Symposium and the 23rd Meeting of the Department of Defense Human Factors Engineering Technical Group. This user's manual is keyed to Version 2.0 of the SORD software, which was released in March 1991. Beginning in Fiscal Year 1992, SORD will become the required, standard technique for designing Army units, as specified in draft TRADOC Regulation 71-17.

EDGAR M. JOHNSON
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ACKNOWLEDGMENTS

USER'S MANUAL FOR THE SYSTEMATIC ORGANIZATIONAL DESIGN
METHODOLOGY

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PART ONE -- INTRODUCTION

Purpose of this Manual

This manual is designed to provide both a quick reference and step-by-step instructions for using the Systematic Organizational Design (SORD) methodology. Each step of this procedure is illustrated with data from simplified units.

Background

SORD was developed in response to an Army need to standardize the process for creating initial concepts for organizing Army units and for incorporating those concepts into a document called the Unit Reference Sheet in accordance with TRADOC Regulation 71-17. The factors leading to the development of SORD, the approach used, and a discussion of the unit design process that is incorporated into SORD are presented in a previously published research product (Christ, Conroy, & Briggs, 1990). Consequently, only a brief overview of SORD is presented here.

Overview of the SORD Methodology

SORD is a PC-based system for assisting in developing the initial designs of Army units up to and including company-size units. SORD is a process that can help structure and systematize unit design development through the stage of producing a Unit Reference Sheet (URS). SORD is more of a process than a processor because the user is the one who makes all decisions about requirements, personnel, and design.

SORD consists principally of menus and data input screens. The basic approach of the system is one of helping establish the requirements of a unit and then matching types of personnel and materiel to those requirements. The system will help document unit requirements and the assumptions and decisions made in designing a unit. Thus it provides a valuable audit trail.

SORD is composed of three major subsystems, a data base, and a report generation module. As depicted in Figure 1, these five components of SORD have the following uses:

```
MISSION TO FUNCTION SUBSYSTEM (MFS)          UNIT DESIGN SUBSYSTEM (UDS)

Mission Conditioning Module               Materiel Systems Identification Module
   Enter mission and tasks
   Prioritize tasks                       Personnel Identification Module
   Enter assumptions
   Enter scenario                         C2 and Structure Development Module
                                             Design structure
Mission Quantification Module                Assign assets
   Quantify tasks                            Identify C2 & support assets

Function Determination Module             Constraints Application Module
   Select functions                          Identify constraints
   Quantify/Specify function                 Eliminate Assets


DESIGN EVALUATION SYSTEM (DES)
   Identify Requirements
   Identify Capabilities
   Accept, Reject, or Waive               CREW/CELL DATA BASE

           REPORT                            Develop Crew/Cell
                                             Modify Crew/Cell
   Produce Std URS Report                    Delete Crew/Cell
```

Figure 1. A flow diagram showing the components of the SORD methodology and the possible transition among these components.

(1)   The Mission to Function Subsystem (MFS) helps the user translate a mission statement into specific tasks and functions that the unit must perform.

(2)   The Unit Design Subsystem (UDS) helps the user assign appropriate materiel and personnel assets to the unit and to specify the organizational structure of the unit and its support personnel.

(3)   The Design Evaluation Subsystem (DES) helps the user to evaluate the match between the unit requirements and the capabilities of its materiel and personnel assets.

(4)   The report module calls up a report generation process that creates a URS report either on the screen or on paper.

(5)   The Crew/Cell Data Base helps the user develop and store crews and cells of personnel and materiel that can be used repeatedly in designing different elements within and across units.

Required Knowledge and Skills of the SORD User

To be able to install and use SORD properly, the user will need the following knowledge and skills:

- Knowledge of the configuration of both the software and hardware of the system to host SORD.

- Familiarity with and an ability to use the basic DOS commands such as those to make a directory, copy and delete files, and display a directory's contents.

- The knowledge and skills necessary to design units effectively without SORD.

NOTE: It must be stressed that SORD cannot be used as a substitute for the thought processes of an experienced unit designer or, at least, an experienced combat developer. SORD assumes that the user has access to and is aware of sources of information that are required to develop a URS. In short, SORD assumes an expert user.

Acquisition of the SORD Methodology

The March 1991 version of the SORD methodology software is available on a set of six 5 1/4-inch low-density (360 K) floppy diskettes. Individuals wishing to obtain a copy of this SORD software should contact the Army proponent for SORD at the following address:

Deputy Commanding General for Combat Development
ATTN: ATZL-CDF-B (Mr. Kenneth Jones)
Fort Leavenworth, Kansas 66027-5300
Telephone: (913) 684-2910

The SORD proponent should also be contacted for information concerning more recent versions of the software or editions of this user's manual that may have been produced since the date of publication of this manual.

PART TWO -- INSTALLING AND UNDERSTANDING SORD
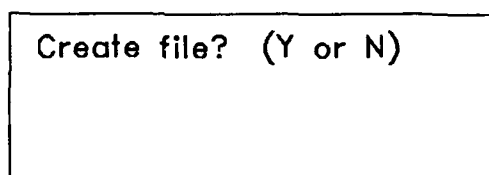
Before Proceeding Further

This part of the manual should be read carefully before using SORD. It provides information on the computer hardware and software that is needed to run SORD, as well as instructions on how to install and interface with SORD on your computer.

Conventions of this Manual

SORD Screens

A complete SORD screen will always be shown within a box; either a box in the shape of the screen or a smaller one such as the following.

```
Create file?  (Y or N)
```

Figure 2. Illustration of a complete SORD screen.

References to Specific Features of SORD Screens

References to specific features of SORD screens, whether menu options or prompts to the user, will be shown in this manual within quotation marks and, as nearly as possible, just as they appear in the SORD screen (e.g., "Unit Design Subsystem" and "JOB TITLE").

Important Messages

Important messages appear in bold type without quotation marks and are preceded by alerting words such as NOTE or IMPORTANT.

User Input

User input will always be shown in bold type and capital letters and will be enclosed within quotation marks as in the following: **"USER INPUT"**. You should not include the quotation marks.

Even though prompted user alphanumeric input is shown in this manual in uppercase characters, the SORD software will accept both uppercase and lowercase inputs. These alphanumeric inputs are stored and retrieved as entered for text and for filenames of crews and cells. For unit filenames, SORD does not distinguish between uppercase and lowercase input, but treats both as only uppercase.

Specific Keyboard References

References to specific non-alphanumeric keys in the keyboard will be in bold type and will appear in "less than" and "greater than" signs (e.g., <**Return**> and <**PgDn**>).

Hardware and Software Requirements

Required Hardware

The following hardware is required as a minimum:

System	IBM-PC/XT or compatible personal computer.
Hard Disk	Disk drive of at least 2 megabytes (MB).
Available Memory	640 BYTES of system memory and 520k bytes free.
Graphics Board	A graphics board with a resolution equal to or better than CGA.
Printer	Locally dedicated Epson-compatible printer. Printer must be accompanied by a program which will convert screen graphics into a graphics form for the printer. Generally, the program called GRAPHICS.COM supplied with DOS will be sufficient.
	Laser printers are incompatible with the SORD program and will not print SORD output.

Optional Hardware

AT system or faster class of machine

Mouse

Color Monitor

Required Software

If you have a CONFIG.SYS file, it must contain the following two lines:

    files = 20
    buffers = 20

If you do not have these lines in your CONFIG.SYS file you can add them by using an editor such as DOS's edlin.

Installing SORD

Backup Copies

The user should create backup copies of each of the SORD diskettes before using them. The user should use the DOS Diskcopy command to make the copies.

Installation Procedure

A program on the SORD #1 diskette will install SORD on your hard disk. The entire SORD system is contained on six diskettes. The installation program can be run by completing the following.

(1) Insert #1 diskette into the A: drive.

(2) Type "A:" and press <Return>. This will set the default disk drive to A:.

(3) Run the installation program by typing "INSTALL" at the DOS prompt and pressing <Return>.

(4) The user will be prompted for the drive and directory to which SORD will be copied. The default drive will appear in brackets: [c:]. Choose the default drive by pressing <Return>.

Then, the default directory will be displayed in brackets: [\SORD]. Choose the default directory by pressing <Return>.

NOTE: If a copy of the SORD software already exists on the resident system, choosing the default directory will display the following message: "Warning: directory exists, continue [y/n]." Type "Y" if the new software is to overwrite the one already in the system. This action will not affect unit files created by the user with earlier versions of SORD.

(5)   Insert the #2 diskette and press <Return>
       when prompted by the installation program.

(6)   Repeat step #5 for diskettes #3 - #6.

An additional point should be made about the
installation program. The installation program
sets certain environmental parameters that may
make SORD **incompatible** with the resident system's
Local Area Network (LAN). Therefore, it will be
necessary to start SORD from within DOS or from a
non-network menu, if one exists on the resident
system. SORD <u>cannot</u> be started from within the
resident system's LAN environment. The procedure
for starting SORD will be discussed in the next
section.

Basic Operational Features of SORD

Starting SORD

        Assuming that the SORD program cannot be accessed
from a non-network menu, SORD can be started from
within the DOS environment.
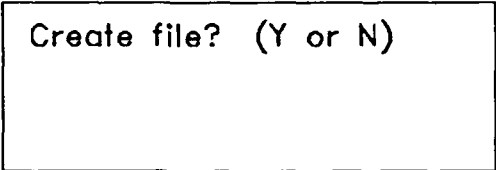
(1)   Once in the DOS environment type **"C:"**
       followed by <Return> to enter the C: drive.
       The prompt, **"C:\"** will appear.

(2)   Type **"CD SORD"** and then press the <Return>
       key to enter the SORD subdirectory.

(3)   To start SORD, make sure you are in the SORD
       subdirectory of the C: drive. Type **"SORD"**
       and press <Return>. The SORD title screen
       will appear.

(4)   At the SORD title screen, press <PgDn> as
       prompted. The message box illustrated in
       Figure 3 will appear, prompting the user to
       enter a new or existing (previously specified
       and saved) filename. The user must type in

```
┌─────────────────────────────────────┐
│  Enter data set name:               │
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```

Figure 3.   Screen   output
prompting a SORD filename.

a unit filename in order to continue. For the purpose of facilitating this set of instructions, the user should type **"AMMOCO"** at the prompt and press **<PgDn>**. Doing so will create the data set of a unit named AMMOCO, which will be referred to throughout this introduction. Upon pressing **<PgDn>**, the prompt shown in Figure 4 will appear.

NOTE: A data set name or unit filename can be any string of eight or fewer alphanumeric characters.

```
┌─────────────────────────────────────┐
│                                     │
│  Create file?  (Y or N)             │
│                                     │
│                                     │
│                                     │
└─────────────────────────────────────┘
```

Figure 4. Screen output querying whether a new file is to be created.

(5) To facilitate these instructions, the user should type **"Y"** in response to the prompt illustrated in Figure 4. By doing so, the user is indicating that the unit file, AMMOCO is to be created.

WARNING: If the user enters an existing filename in response to the prompt shown in Figure 3, that data set will be called up and accessed by the SORD program. In this case, the prompt shown in Figure 4 will not be presented to the user as the chosen file will have already been created.

Any subsequent inputs or changes made to the data set will be written over the original file; the data set contained in the original file will no longer exist. If this is not the intention of the user, the user should exit SORD using instructions given below and start over using a new filename. If the user enters a filename that is thought to already exist and the prompt shown in Figure 4 is presented, the filename accessed has not previously been created. At this point, the user should enter "N" to prevent the creation of the filename entered in error, and view the unit files that have been created. Subsequent sections of the user's manual will discuss saving and managing SORD unit files.

Saving Unit Files in SORD

SORD allows the user to save files at any time by pressing <F3>. Pressing <F3> will cause the save file prompt illustrated in Figure 5 to appear. To continue these instructions, the user should enter "Y".

	QUITTING SORD	
Save Ammoco (Y or N) Y		

Figure 5. Option allowing the user to save the SORD unit file.

Exiting SORD

The <F3> key also allows the user to exit the SORD program. The prompt illustrated in Figure 6 will appear after the user has responded to the save file prompt. To continue these instructions, the user should enter "N".

	QUITTING SORD	
Save Ammoco (Y or N) Y		
Exit SORD (Y or N) N		

Figure 6. Option allowing the user to quit SORD.

Managing SORD Files

Entering and Exiting the DOS Shell

(1) To temporarily exit the SORD program and access the DOS shell, the user should press

<F7>. Doing so moves the system to the DOS environment while keeping SORD resident in memory. The DOS prompt, "C:\SORD", will be displayed.

(2) To return to the SORD program, the user should enter **"EXIT"** after the DOS prompt and press <**Return**>. These actions will return the user to the SORD screen where the <**F7**> key was pressed.

Viewing the Contents of the SORD Directory

To view unit files, it is necessary to use the DIR command while in DOS. The user should perform the following steps:

(1) To facilitate these instructions, press <**F7**> to temporarily exit SORD and enter the DOS environment. The prompt "C:\SORD" will appear.

(2) Type **"DIR"** and press <**Return**> to display the files in the SORD directory. These will include the SORD files created by the user. The SORD directory will list four kinds of entries:

(a) Subdirectories corresponding to the four major subsystems of the SORD software (i.e., MFS, CREW, DES, UDS).

(b) Batch files created during the SORD installation procedure (e.g., autoexec.old, config.old)

(c) The SORD executable program, SORD.EXE.

(d) SORD data set or unit filenames. These files are created when the user enters a data set filename in response to the prompt illustrated in Figure 3. The following section will discuss the SORD data files in detail.

Types of SORD Data Set Filenames

By creating and saving a SORD unit file, the user is in fact creating four DOS files. These files consist of the filename (e.g., "AMMOCO") followed by a period and by one each of the following four suffixes:

.DAT   Filenames ending in .DAT contain the data entered into SORD unit files. Filenames with the DAT suffix do not exist until the SORD data file is saved.

.ODA   Filenames ending in .ODA are temporary work files and reflect changes to the unit file occurring since the last saving of the file. When a unit file is saved, the contents of the .DAT file are replaced with the contents of the .ODA file. A file with an ODA suffix only exists while the user is working on a unit file. When the user exits SORD, this file disappears.

.IDX   Files ending in .IDX serve to index the location of the data in a unit file.

.ODX   Filenames ending in .ODX refer to working copies of files ending in .IDX. Like the files with ODA suffixes, they only exist while the user is in SORD.

Copying Unit Files to Other Drives

DOS provides copying capability for SORD unit files. To copy a unit file, perform the following steps:

NOTE: The steps described below for copying a unit file do not have to be followed by the user at this time. This information is intended to serve as a reference.

(1)   Type <F3> to display the box allowing unit files to be saved. Save the unit file but do not exit SORD.

(2)   Type <F7> to enter DOS.

(3)   Once in DOS, type the following command on a single line.

(a) Type "COPY" followed by a space.

(b) Type the name of the file to be copied followed by a dot and then an asterisk (Filename.*)

(c) Type a space followed by "C:" (The designation for the disk drive containing the SORD files). Type a space.

(d) Type the letter designation for the disk drive to which you want the SORD unit file to be copied. For example, if you want the file copied to drive A, type "A:"

The full copy command will have the following format (assuming that the unit filename is AMMOCO).

Copy AMMOCO.* C: A:

Copying and Renaming Unit Files in the SORD Directory

Renaming unit files in the process of copying them allows the user to create a duplicate set of unit files. To rename a unit file, perform the following steps:

NOTE: The steps described below for copying a file do not have to be followed by the user at this time. This information is intended to serve as a reference.

(1) Type <F7> to enter DOS. The C:\SORD prompt will appear.

(2) Copy and rename the file in the C:\SORD directory by typing the following command on a single line.

(a) Type "COPY" followed by a space followed by the name of the file to be copied.

(b) Type a space followed by the name to be given to the duplicate file. This duplicate filename must be different from the original filename, otherwise an error message will appear.

The full copy command will have the
following format (assume that the
original unit filename is AMMOCO
and the name of the duplicate unit
file is NEWFILE).

Copy AMMOCO NEWFILE

NOTE: If the user wishes to introduce changes to a
unit file for the purpose of creating an alternative
unit design, but does not want to destroy the original
unit file, the user must create a renamed copy of the
original unit file by following the procedure for
copying unit files within the C: directory.

Deleting Unit Files

To delete user-created unit files from the SORD
directory, the user would perform the steps listed
below.

(1) Type <F7> to temporarily exit SORD and enter
     DOS.

(2) Type **"ERASE"** or **"DELETE"** and then a space and
     then the name of the file. Immediately after
     the filename, type a dot and then an asterisk
     (FILENAME.*). This action will cause all the
     files associated with a given file name to be
     deleted. If the user wished to delete the
     newly created unit file, AMMOCO, the full
     delete command would have the following
     format.

ERASE AMMOCO.*

However, as later sections of this manual
will use the AMMOCO file for illustration
purposes, the user may wish to preserve it.

(3) Type "Exit" to return to SORD.

Moving Around in SORD

Knowing Where You Are

To aid in the navigation process, SORD provides
path information at the upper left-hand corner of every
screen. This path information corresponds to a unique
designation for each screen in SORD, and provides a
"you are here" reference. For example, the Unit Data
Dialogue screen (see Figure 11) has the designation

"SORD-MFS-MCM-UDD" indicating that the screen "Unit Data Dialogue" (UDD) is an element of the Mission Conditioning Module (MCM). The MCM is in turn an option of the Mission to Function Subsystem (MFS) and the MFS is an option of the SORD main menu.

Moving Between Subsystems and Modules

The hierarchical representation of SORD is represented in Figure 7. Figure 7 shows that the
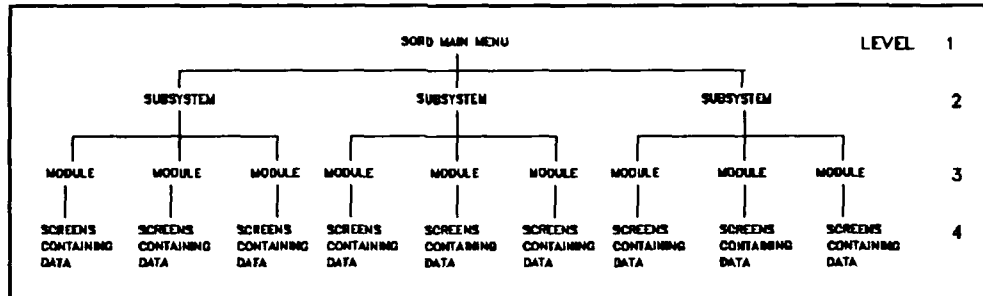
Figure 7.   Graphic   representation   of   the   SORD hierarchy.

SORD subsystem hierarchy occupies four levels. The SORD Main Menu occupies Level 1. The menus for the three subsystems (MFS, UDS, & DES) occupy Level 2; Level 3 consists of modules; and Level 4 consists of data input screens, summary screens, and screens for transferring to higher levels of SORD.

To change locations in the SORD hierarchy, do the following:

(1)   Press <F5> to transfer to the SORD Main Menu.

(2)   Press <Return> to select items from the main menu.

(3)   Press <PgUp> or <PgDn> to change levels in the SORD hierarchy.

Figures 8 through 11 provide an illustration of the progression from the highest level of SORD to the lowest. The arrows in these figures refer to the selected options of each menu. The user need not be concerned with trying to access these menus now; the procedure will be discussed in greater detail below.

```
┌─────────────────────────────────────┐
│                SORD                  │
├─────────────────────────────────────┤
│           SELECT SUBSYSTEM           │
├─────────────────────────────────────┤
│  Introduction                        │
│                                      │
│  Mission to Function Subsystem  ◄────────
│                                      │
│  Unit Design Subsystem               │
│                                      │
│  Design Evaluation Subsystem         │
│                                      │
│  Crew Data Base                      │
└─────────────────────────────────────┘
```
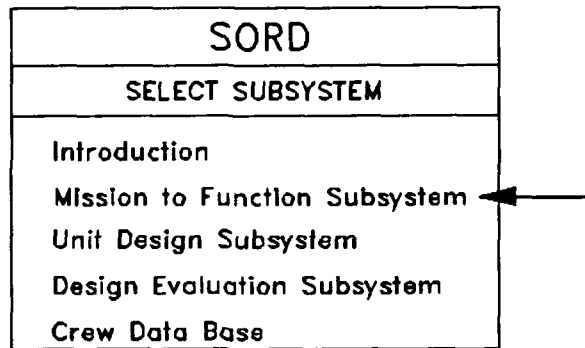
Figure 8. Level 1 - SORD Main Menu.

Beginning with the SORD Main Menu illustrated in Figure 8, the user presses the <**Return**> key to select menu options and presses <**PgDn**> to transfer to the second hierarchical level of SORD. Selecting "Mission to Function Subsystem" and pressing <**PgDn**> will cause the screen illustrated in Figure 9 to appear.

Figure 9 demonstrates that Level 2 of the SORD hierarchy, the subsystem level, also consists of menu screens. The Mission to Function Subsystem (MFS) Main Menu is illustrated in Figure 9. From this menu, select the option "Mission Conditioning Module". Pressing <**PgDn**> will transfer the user to the third level of the SORD hierarchy and will display the screen illustrated in Figure 10.

```
┌─────────────────────────────────────────┐
│ SORD-MFS-MM                              │
│ ┌─────────────────────────────────────┐ │
│ │ Mission To Function Subsystem (MFS) │ │
│ └─────────────────────────────────────┘ │
│                                          │
├──────────────────────────────────────────┤
│           MFS Main Menu                  │
├──────────────────────────────────────────┤
│  Mission Conditioning Module  ◄──────    │
│  Mission Quantification Module           │
│  Function Determination Module           │
│  SORD Main Menu                          │
└──────────────────────────────────────────┘
```
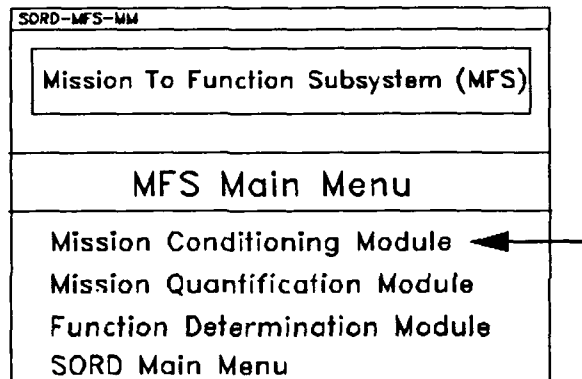
Figure 9. Level 2 - Mission to
Function Subsystem Main Menu.

Figure 10 demonstrates that Level 3 also consists
of menu screens. Selecting "Design New Unit" from the
menu options illustrated in Figure 10 transfers the
user to Level 4 screens, one of which is shown in
Figure 11. At Level 4, the user is able tc enter data.

```
┌─────────────────────────────────────────┐
│ SORD-MFS-MCM-MEI                         │
│ ┌─────────────────────────────────────┐ │
│ │   Mission Conditioning Module       │ │
│ └─────────────────────────────────────┘ │
│                                          │
├──────────────────────────────────────────┤
│           MCM Main Menu                  │
├──────────────────────────────────────────┤
│  Design New Unit         ◄────────────   │
│                                          │
│  Mission to Function Subsystem           │
│                                          │
│  SORD Main Menu                          │
│                                          │
└──────────────────────────────────────────┘
```
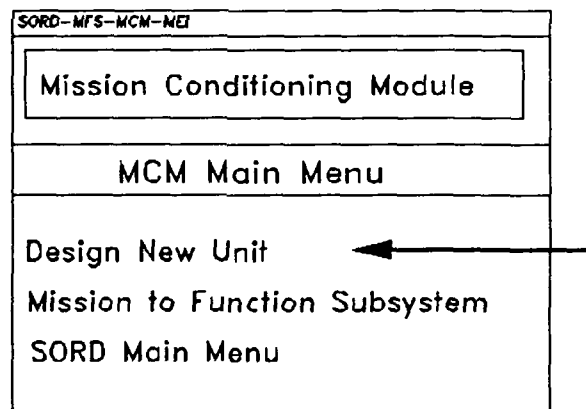
Figure 10.   Level 3 - Mission
Conditioning Module Main Menu.

Figure 11. Level 4 - screen for entering data.

Moving from Screen to Screen

To move from screen to screen, press the <PgUp> and <PgDn> keys. These keys permit the user to change levels of the SORD hierarchy and also to move through the data entry screens at Level 4. For example, choosing the option "Design New Unit" of the MCM Main Menu (see Figure 10) will cause a series of 13 data entry screens to appear. Pressing <PgDn> allows the user to progress through these data entry screens. In some instances, SORD will not allow the user to leave a screen if incomplete or incorrect data have been entered. If the user needs additional information about required input, press <F1> and a help message will appear at the bottom of the screen. All of the function key options will be discussed later in this section.

Changing Fields on One Screen

Type the <Return> or <Shift-Tab> keys to change field locations on a screen. Pressing <Return> moves the cursor downward. SORD provides a wrap-around function which positions the cursor at the top of the screen if <Return> is pressed repeatedly. Similarly, pressing <Shift-Tab> moves the cursor upward.

Entering and Editing Data Within a Single Field

If text has been entered into a field, the user has available many standard text editing functions. <Home> and <End> move the cursor to the beginning and

end of a line of text. <Ctrl-Home> and <Ctrl-End> move
the cursor to the beginning and end of the field.
However, if text has not been entered, the cursor can
be moved forward only by typing alphanumeric and
special characters or by pressing the space bar.

Aids in Using SORD

<u>Function Keys</u>

Several of the function keys are programmed by
SORD to execute frequently required functions.
Pressing <Esc> displays a menu containing these
function keys. That menu is displayed in Figure 12.

```
┌─────────────────────┐
│ Calculator   F 10   │
│ DOS Shell    F 7    │
│ Help         F 1    │
│ Print        F 2    │
│ Save/Quit    F 3    │
│ SORD Map     F 4    │
│ SORD Menu    F 5    │
└─────────────────────┘
```

Figure 12.   SORD
function key menu.

Each of function key options will be discussed
briefly.

<F1> Help screen   If the user is ever unsure of
                              the purpose of a SORD
                              screen, press <F1> and a help
                              message will appear.

<F2> Print   Pressing <F2> causes the
                              screen currently being
                              displayed to be printed. The
                              user can utilize SORD print
                              options if the resident system
                              is connected to a locally
                              dedicated Epson-compatible
                              printer.

<F3> Save/Quit   Pressing <F3> will display a
                              screen enabling the user to
                              save the current SORD unit

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file. The user will then be given the option of exiting SORD.

<F4> SORD MAP

Pressing <F4> displays a map of the SORD subsystems. This map represents each of the modules of the SORD subsystems in the order in which data are entered into them. The SORD map display is illustrated in Figure 13. The F's shown in
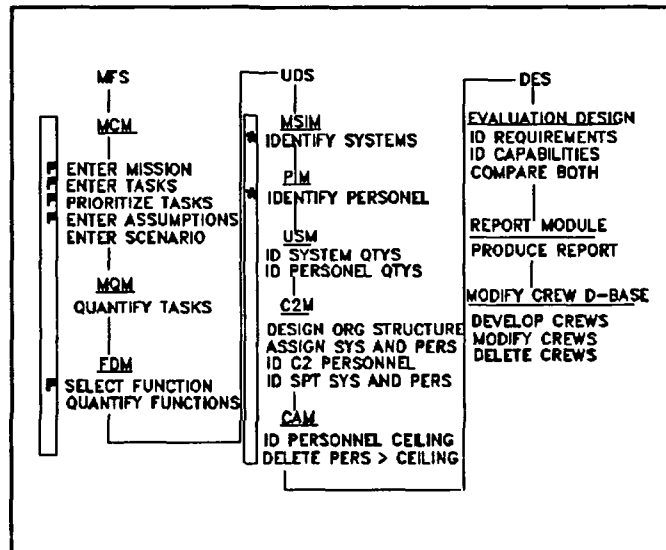
Figure 13. Map of the SORD system.

Figure 13 refer to modules that have been completed. The asterisks refer to modules currently being worked on.

The map also allows users to transfer from one module to another. To choose a destination, press <**Return**> or <**Shift-Tab**> to move the highlight over the desired module. Press <**PgDn**> to transfer to that module. Pressing <F4> will give the user the option of returning to the previous location in SORD.

NOTE: Because of the large memory requirements of SORD data files, using the map to transfer from one module to another may cause the system to crash. It is therefore recommended the current file be saved before the <F4> option is utilized.

<F5> SORD Main Menu

Pressing <F5> will transfer the user to the SORD Main Menu.

<F7> DOS shell

Pressing <F7> enables the user to temporarily exit the SORD environment and enter the DOS environment.

<F10> Calculator

Pressing <F10> causes a calculator to appear.

The SORD Mouse

If the hardware includes a mouse and a resident mouse driver program, SORD will recognize them both and enable your mouse to be used in SORD. Most of the commercially available mice come with a mouse driver program. However, in order for SORD to enable the mouse, the mouse driver program must be installed according to the manufacturer's instructions.

It is possible to use a mouse in SORD whenever the mouse pointer or cursor is visible. Usually this is for the selection of menu options and for calling up the function key menu. Menu options can be selected by positioning the mouse on the desired option and pressing the left button of the mouse. If the mouse cursor is on a menu, it is possible to select the menu's options only by using the mouse. If the mouse cursor is not on a displayed menu, menu options can be selected by pressing <PgDn>. This procedure was discussed in a previous section.

The SORD Main Menu

The SORD main menu, illustrated in Figure 14, is the principal means of moving among major components of SORD. The menu has five options: one for the introductory screens, one for each of the three SORD subsystems, and one for the Crew/Cell Data Base. The introductory screens are discussed in the next section.

The SORD Introduction Screens

The four screens available with the "Introduction" option of the SORD Main Menu provide (a) a brief and general description of the purpose of SORD and its major components, (b) a map showing the interrelationships among these major components, (c) a review of procedures for moving around in SORD, and (d) a review of the use of function keys and other text-editing keys. To a great extent, these four introductory screens provide a summary of the more important "operational" information given in Parts One and Two of this users manual. Since the SORD Main Menu and its option for calling up these introduction screens is always available while using SORD (by pressing <F5>), the summary information on these screens is always available to serve as a quick reference to principal SORD-user interface features.

SORD
SELECT SUBSYSTEM
Introduction
Mission to Function Subsystem
Unit Design Subsystem
Design Evaluation Subsystem
Crew Data Base

Figure 14. SORD Main Menu.

The remaining parts of this manual correspond to, and are named after the major subsystems of the SORD software and the crew/cell data base. Part Three describes the Mission to Function Subsystem (MFS) which enables the user to specify the mission-based requirements of the organizational unit to be created. Part Four concerns the Unit Design Subsystem (UDS) which aids the user in designing a structured unit comprised of the appropriate numbers and types of major materiel and personnel resources. The third major component of SORD, the Design Evaluation Subsystem, is discussed in Part Five. The Design Evaluation Subsystem aids the user in assessing and verifying that the capabilities of the unit designed in the UDS will match the mission requirements specified in the MFS.

Part Six of the manual describes the procedures the user will follow in designing crew or cells and in incorporating these organizational elements into the design of larger units. Finally, Part Seven concludes this manual by presenting a summary of the Army need for SORD, the SORD process, and the benefits to be derived from using SORD. User feedback forms are contained in the two appendices of the manual.

PART THREE -- THE MISSION TO FUNCTION SUBSYSTEM

The first of the three SORD subsystems, the Mission to Function Subsystem (MFS), ensures that the design of a unit is driven by the unit's mission requirements. In this subsystem, the user (a) specifies the basic characteristics of the unit and its operational environment, (b) lists, prioritizes, and quantifies the tasks that the unit must perform, and (c) translates those tasks into a set of required unit functions.

Selecting the "Mission To Function Subsystem" option from the SORD Main Menu will display the Mission to Function Subsystem Main Menu (MFS Main Menu), illustrated in Figure 15. Figure 15 shows that the MFS is composed of three options for accessing three MFS modules and one allowing the user to return to the SORD main menu.

```
SORD-MFS-MM

  ┌──────────────────────────────────────┐
  │ Mission To Function Subsystem (MFS)   │
  └──────────────────────────────────────┘

        MFS  Main  Menu

   Mission Conditioning Module
   Mission Quantification Module
   Function Determination Module
   SORD Main Menu
```
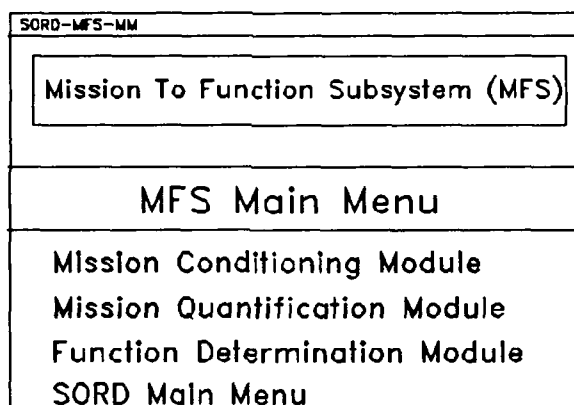
Figure 15. MFS Main Menu.

The Mission Conditioning Module (MCM)

Selecting the "Mission Conditioning Module" option in the MFS Main Menu will display the MCM Main Menu, illustrated in Figure 16. The MCM Main Menu has three options, one to initiate the design of a new unit, one to return the user to the MFS Main Menu, and one to return the user to the SORD Main Menu.

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```
SORD-MFS-MCM-MEI
┌─────────────────────────────────────┐
│  Mission Conditioning Module        │
└─────────────────────────────────────┘

        MCM Main Menu

Design New Unit

Mission to Function Subsystem

SORD Main Menu
```
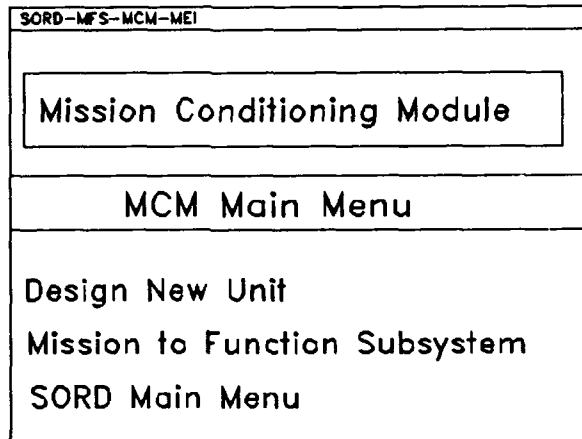
Figure 16. MCM Main Menu.

Data Input for the MCM

Selecting the "Design New Unit" option causes a series of 13 screens to be presented to the user. These screens permit the user to specify the basic characteristics of the unit, its mission and tasks, and its operational environment. Specifically, the "Design New Unit" option of the MCM Main Menu causes screens to appear requesting the following information (in the order given here):

(1) The name and identity of the designer and unit to be designed. (This screen has been previously discussed and is illustrated in Figure 11.)

(2) The echelon level of unit that is being designed (e.g., company, platoon, section, or team).

(3) The echelon level to which the unit being designed is assigned.

(4) The MARC category to which the unit is assigned.

(5) The mobility characteristics of the unit.

(6) The mission of the unit.

(7) The concept of operation of the unit.

(8) Tasks that the unit is required to perform.

(9)   The priority ranking of required tasks.

(10) Assumptions made that can influence the requirements of the unit.

(11) The priority ranking of possible areas of operation.

(12) Base-case scenario information reflecting the type of operation.

(13) Base-case information reflecting opposing forces and required support.

IMPORTANT: Be sure to press <F3> and save the unit file after every substantial input of data.

Most of the requested information is entered by responding to probes that offer multiple-choice response alternatives. Three of the screens will roll over or be reproduced if the user has more information to enter than is possible with one screen. Specifically, the user can enter up to 12 tasks and up to 12 assumptions, with six on each of two input screens, and up to three screens of text describing the concept of operations. For each of these three types of information, the user must press the <PgDn> key after entering input into the last line of an existing screen to call up the next screen for entering the same type of data. If, in these three cases, the user does not enter data into the last line of an initial input screen, pressing the <PgDn> key will cause the screen for the next type of input to be displayed; the second or third screen for these inputs will not be presented unless they are needed.

Required Input for the MCM

The user will not be permitted to exit the MCM and proceed to other components of SORD unless required tasks of the unit are entered and prioritized (see the information requested in the 8th and 9th input screens described above). For the purpose of continuing this introduction, the user must enter and prioritize brief descriptions of some required tasks. The procedure for entering and prioritizing two specific tasks are described below.

Once in the MCM option for designing a new task, display the screen that requests descriptions of the unit's required tasks by repeatedly pressing <PgDn>. The screen of interest is the eighth screen in this MCM option and is illustrated in Figure 17. The cursor

will be located at the beginning of a 2-line, 110-character field for entering a description of the first task. Type in the description of the first task shown in Figure 17. Then press <Return> and the cursor will move to the beginning of the field used for the description of the second task. Type in the information given for the second task, as shown in Figure 17. Since this example unit has only two tasks, press <PgDn> to advance to the next (i.e., the ninth) screen for this MCM option.

Figure 17. Tasks to be performed by the unit.

The ninth screen, illustrated in Figure 18, lists the two tasks in the order in which they were entered, and instructs the user to enter a number in front of each task to indicate the relative importance or priority of that task to the unit's mission. For example, if the first task, "RECEIVE, STORE, WAREHOUSE, AND ISSUE AMMO" were the most important, it would be assigned a 1. Ties are not permitted. After assigning priorities to all of the tasks, press <PgDn> to access the next input screen in this MCM option.

After the thirteenth screen of the "Unit Data Dialogue" option has been displayed, pressing <PgDn> will cause the MCM Main Menu to be displayed. From that menu, MFS can be selected to continue this description of the SORD program.

IMPORTANT: Be sure to press <F3> and save the unit file after every substantial input of data.

Figure 18. Screen allowing task priorities to be assigned.

The Mission Quantification Module (MQM)

Selecting the "Mission Quantification Module" option of the MFS Main Menu will display the MQM Main Menu, illustrated in Figure 19. The MQM Main Menu presents four options. One option permits the user to quantify the required tasks of the unit as they are each, in turn, selected. The other three options permit the user to view the quantifications assigned to each task, return to the MFS Main Menu, or return to the SORD Main Menu.

Figure 19. MQM Main Menu.

Figure 20 illustrates the screen displayed upon selection of the "Choose a Task to Quantify" option of the MQM Main Menu. To input quantitative information

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for each of the mission essential tasks, the following steps need to be taken.

```
SORD-MF5-MQM-CQ
┌───────────┐
│           │
│  Choose a Task to Quantify

☐ 1. RECEIVE, STORE, WAREHOUSE, AND ISSUE AMMO
☐ 2. DETERMINE UNIT AMMO NEEDS.
☐
☐
☐
☐
☐
☐
```

Figure 20. Task quantification menu.

(1)   Once in the screen illustrated in Figure 20, press the <**Return**> or <**Shift**>-<**Tab**> keys to move the cursor next to the task to be selected for quantification. Press any key and an asterisk will appear in the box indicating that the task has been chosen.

(2)   Repeatedly pressing <**PgDn**> causes a series of six screens to be displayed, the first five of which prompt the user for the following types of quantitative information for the selected task:

(a)   The _frequency_ with which the task is performed.

(b)   The _speed_ at which and the temporal _duration_ over which the task is to be performed.

(c)   The _amount of a commodity_ or resource consumed and the _distance moved_ during task performance.

(d)   The required _accuracy_ of task performance.

(e)   Up to _four other task attributes_, specified by the user, can be quantified to further specify the requirements of the task.

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After the user has moved through these 5
screens for a selected task, a sixth screen
will appear containing a summary of the
quantitative information the user entered for
the selected task. Omitted entries will
not be listed. The next press of the <PgDn>
key will cause the "choose a task to
quantify" menu (see Figure 20) to reappear.

(3) Repeat Steps 1 and 2 for each of the tasks
     listed in the menu.

After the user has progressed through all six
quantification screens for each mission essential
task, the MQM Main Menu (see Figure 19) will reappear.
Selecting the "Mission to Function Subsystem" option of
that menu will cause the MFS Main Menu to be displayed
(see Figure 15).

**IMPORTANT: Be sure to press <F3> and save the unit
file after every substantial input of data.**

**NOTE: The user does not have to quantify mission
essential tasks prior to moving on to other modules and
subsystems of SORD. However, during the development of
URS, the user must insure his or her own understanding
of the unit's mission requirements by working through
the steps necessary to complete the inputs requested in
the Mission Quantification Module. While not required
to continue the SORD process, the information requested
in this module is necessary to complete the URS report
and to create a useful audit trail.**

The Function Determination Module (FDM)

Selecting the "Function Determination Module"
option of the MFS Main Menu will display the FDM Main
Menu, illustrated in Figure 21. This third and final
option of the Mission to Function subsystem allows unit
tasks to be expressed as functions. The conversion
from tasks to functions is necessary because materiel
systems and personnel are assigned to the unit to
fulfill functional requirements that are, in turn,
driven by the mission of the unit.

```
┌─────────────────────────────────────────────┐
│ SORD-MFS-MDM-MM                              │
│ ┌─────────────────────────────────────────┐ │
│ │   Mission to Function Subsystem         │ │
│ │   Function Determination Module         │ │
│ └─────────────────────────────────────────┘ │
│                                             │
│            FDM Main Menu                    │
│                                             │
│ Choose Task for Function Identification     │
│ Display Functions/Descriptors Selected      │
│ Mission to Function Menu                    │
│ SORD Main Menu                              │
└─────────────────────────────────────────────┘
```

Figure 21.   FDM Main Menu.

As was the case for the MQM Main Menu, the FDM Main Menu presents four options. One permits the user to identify and specify functional requirements for each mission essential task of the unit as they are each, in turn, selected. The other three permit the user to view the functional requirements assigned to each task, return to the MFS Main Menu, or return to the SORD Main Menu.

To select and specify the functions that must be performed by the unit to accomplish its mission, the following actions must be taken by the user.

(1)   Selecting the option labelled, "Choose Task for Function Identification," from the FDM Main Menu, causes the screen illustrated in Figure 22 to be displayed.

```
┌──────────────────────────────────────────────┐
│ SORD-MFS-FDM-CT                              │
│            ┌────────┐                         │
│ ┌──────────────────────────────────────────┐ │
│ │   Choose a Task to Select Functions      │ │
│ └──────────────────────────────────────────┘ │
│                                              │
│ □ 1. ┌──────────────────────────────────────┐│
│      │ RECEIVE, STORE, WAREHOUSE, AND ISSUE AMMO ││
│      └──────────────────────────────────────┘│
│ □ 2. ┌──────────────────────────────────────┐│
│      │ DETERMINE UNIT AMMO NEEDS            ││
│      └──────────────────────────────────────┘│
│ □ 3. ┌──────────────────────────────────────┐│
│      └──────────────────────────────────────┘│
│ □ 4. ┌──────────────────────────────────────┐│
│      └──────────────────────────────────────┘│
│ □ 5. ┌──────────────────────────────────────┐│
│      └──────────────────────────────────────┘│
│ □ 6. ┌──────────────────────────────────────┐│
│      └──────────────────────────────────────┘│
└──────────────────────────────────────────────┘
```

Figure 22.   Task selection menu.

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(2) Once in the screen illustrated in Figure 22, press the <Return> or <Shift>-<Tab> key to move the cursor to the box in front of the task for which functions are to be specified. Press any key and an asterisk will appear in the box to indicate the task has been selected.

(3) Pressing <PgDn> causes the Function Selection Menu, illustrated in Figure 23, to be displayed. The Function Selection Menu is the means by which a required task is partitioned into required functions and subfunctions. Pressing <Return> or <Shift>-<Tab> will move the cursor through 19 function names. When the cursor is in front of a function that is required in order for the unit to perform the selected task, press any key. An asterisk will appear in the box next to the selected function. This indicates that the function has been selected for further specification. The 19 functions listed in the Function Selection Menu are designed to be all inclusive and capable of capturing all the actions required of a unit to accomplish mission essential tasks.

Figure 23. Menu of SORD functions.

(4) When the desired functions have been selected for a specified task, pressing <PgDn> will cause Function Specification Menus to be displayed. These menus allow the user to specify qualitative and quantitative characteristics about the functions that must be performed by the unit. Each of the 19

generic functions has its own unique, but
similarly formatted, function specification
screens. There are from one to three screens
per function, for a total of 51 function
specification screens for the 19 functions
that can be selected for each mission
essential task of the unit. For example,
Figures 24 and 25 illustrate the two function
specification screens that will be displayed
whenever the function, "TO ACQUIRE - COMBAT
INFORMATION & INTEL," is selected. Pressing
the <**Return**> or <**Shift**>-<**Tab**> keys cause the
cursor to move through the boxes in front of
the various options available in these two
function specification screens. When the
cursor is in a box in front of a function
specification option that applies to the
selected task, press any key to place an
asterisk in that box. The asterisk indicates
that function specification has been selected
and assigned to the selected task.

(5)   After the user has progressed through all the
function specification screens appropriate
for the selected functions of a specific
mission essential task, the "Choose a Task to
Select Functions" screen (see Figure 22) will
be redisplayed. Repeat Steps 2 though 4
until functions have been determined and
specified for all mission essential tasks.
Then, pressing <PgDn> causes the FDM Main
Menu (see Figure 21) to be redisplayed.

**IMPORTANT: Be sure to press <F3> and save the unit
file after every substantial input of data.**

Figure 24.   First function
specification menu.

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Figure 25. Second function description menu.

Conclusion

At this point, the user has entered all the information necessary to complete the required inputs to the Mission to Function Subsystem of SORD. The information obtained and entered into SORD at this point is sufficient to document the results of a mission analysis that specifies, down to the level of functions to be performed for each mission essential task, the precise requirements that must be fulfilled by the unit. Given this information, and the knowledge and experience acquired in the process of documenting it, the user is ready to actually design the unit. The SORD process for designing the unit is the subject of the Part Four of this manual.

The Unit Design Subsystem (UDS) of SORD will aid the user in designing a structured unit comprised of the appropriate numbers and types of major materiel and personnel assets required to accomplish the mission. Basically this is done by matching functional requirements of the mission with the capabilities of key materiel and personnel, and then sizing out the unit and organizing it into a structured entity.

The UDS is available from the SORD Main Menu, illustrated again in Figure 26. Selecting the "Unit Design Subsystem" option of the SORD Main Menu causes the display of the Unit Design Subsystem Main Menu (UDS Main Menu), illustrated in Figure 27. Figure 27 shows

SORD
SELECT SUBSYSTEM
Introduction Mission to Function Subsystem Unit Design Subsystem Design Evaluation Subsystem Crew Data Base

Figure 26. SORD Main Menu.

that the UDS Main Menu has five options for accessing each of the five UDS modules and one option permitting the user to return to the SORD Main Menu. The first two UDS modules, the Materiel Systems Identification Module (MSIM) and the Personnel Identification Module (PIM), operate in a similar manner to assist the user in identifying candidate materiel systems and soldier specialties to perform the functions previously specified in the MFS. The third UDS module, the Unit Sizing Module (USM), assists the user in assigning the necessary numbers and types of candidate materiel systems and personnel to the unit. The fourth UDS module, the Command and Control and Structure Development Module (C2M), assists the user in creating an organizational structure for the unit and in assigning additional personnel to satisfy requirements imposed by the need for command, control, and other

support functions. The last module in the UDS, the
Constraints Application Module (CAM), assists the user

```
┌──────────────────────────────────────────────┐
│ SORD-UDS-MENU                                  │
│  ┌──────────────────────────────────────────┐ │
│  │     Unit Design Subsystem (UDS)          │ │
│  └──────────────────────────────────────────┘ │
├──────────────────────────────────────────────┤
│              UDS Main Menu                     │
├──────────────────────────────────────────────┤
│  Materiel Systems Identification Module        │
│  Personnel Identification Module               │
│  Unit Sizing Module                            │
│  C2 & Structure Development Module             │
│  Constraints Application Module                │
│  SORD Main Menu                                │
└──────────────────────────────────────────────┘
```
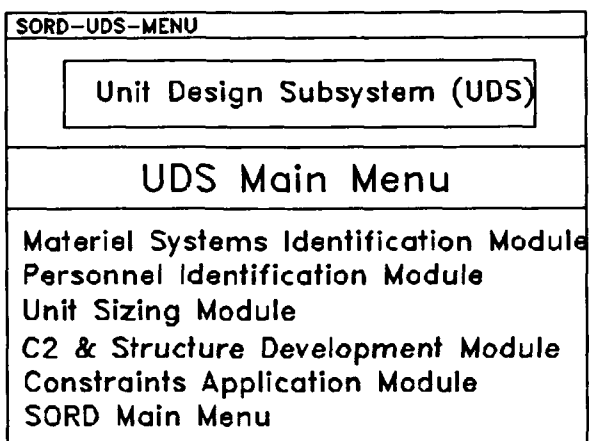
Figure 27. UDS Main Menu.

in identifying and eliminating any personnel from the
unit, as it has been tentatively designed, that exceed
previously imposed personnel constraints or ceilings.
Succeeding sections in this part of the user's manual
will describe each of the five UDS modules.

The Materiel System Identification Module (MSIM)

        This module assists in identifying the types of
materiel systems that should be considered for
inclusion in the unit. The types of systems identified
are those best able to perform the functions specified
in the Function Determination Module of the Mission to
Function Subsystem. Selecting the "Materiel System
Identification Module" option in the UDS Main Menu
causes display of the MSIM Main Menu, illustrated in
Figure 28. The MSIM Main Menu has four options. One
permits the user to identify candidate materiel systems
that have the capability to meet functional
requirements of the unit's mission. The systems
identified in the MSIM do not ultimately have to be
incorporated into the unit design. They can be ignored
later when the numbers of each type of identified
system are specified. The other three options permit
the user to (a) view a summary display of the materiel
systems already identified, (b) return to the MFS Main
Menu, or (c) return to the SORD Main Menu.

Identify Materiel Systems for Specified Mission Functions

Figure 29 illustrates the screen displayed upon selection of the "Identify Materiel Systems" option of the MSIM Main Menu. As can be seen in Figure 29, the user is requested to choose a function from the list of functions previously selected in the Function

```
┌─────────────────────────────────────────┐
│ SORD-UDS-MSIM-MENU                       │
├─────────────────────────────────────────┤
│                                          │
│       Unit Design Subsystem (UDS)        │
│  Materiel Systems Identification Module (MSM) │
├─────────────────────────────────────────┤
│            MSIM Main Menu                │
├─────────────────────────────────────────┤
│   Identify Materiel Systems             │
│                                          │
│   Display Materiel Systems Identified   │
│                                          │
│   Unit Design Subsystem Menu            │
│                                          │
│   SORD Main Menu                        │
└─────────────────────────────────────────┘
```

Figure 28. MSIM Main Menu.

Definition Module of the MFS. To select a function and identify materiel systems having the capability to satisfy the requirements of the function, the following actions need to be taken by the users.

```
┌───────────────────────────────────────────┐
│ ┌─────────────────────────────────────┐   │
│ │ SORD-UDS-USM-FS1       ┌──┐          │   │
│ │                        └──┘          │   │
│ │         Function Selection           │   │
│ │                                      │   │
│ │  Choose a Function to Assign Materiel Systems │
│ │ ┌┐┌────────────────────────────────┐│   │
│ │ │││ To Communicate Internally      ││   │
│ │ │││ To Provide Supply Service      ││   │
│ │ ││└────────────────────────────────┘│   │
│ │ ││                                  ││   │
│ │ └┘                                  ││   │
│ │                                      │   │
│ └─────────────────────────────────────┘   │
└───────────────────────────────────────────┘
```

Figure 29. Function selection menu.

(1)   Once in the screen illustrated in Figure 29, press the <Return> or <Shift>-<Tab> keys to move the cursor next to the function for

which candidate materiel systems are to be identified. Press any key and an asterisk will appear in the box to indicate that the function has been selected.

(2)   Pressing <PgDn> causes the input screen illustrated in Figure 30 to be displayed along with a message box asking if the user wishes to review the qualitative and quantitative requirements of the selected function. These function requirements are those specified in the Function Definition Module of the MFS. If the user enters "Y", for yes, in response to this prompt, control of the screen will transfer to the function specification screens of the FDM. Pressing <PgDn> repeatedly will enable the user to review the specifications entered on those screens for each task for which the identified function was selected. After reviewing all the function specification screens for the identified function, or if the user enters "N" for no in response to the prompt, the screen illustrated in Figure 30 for entering the names of materiel systems will be displayed, without the overlaying message box.

```
 SORD-UDS-MSIM-IMS  ┌─────┐
                    └─────┘
 ┌─────────────────────────────────────────┐
 │         Identify Materiel Systems        │
 └─────────────────────────────────────────┘
 IDENTIFY CANDIDATE MATERIEL SYSTEMS FOR THE FUNCTION:
       ┌───────────────────────────────────┐
       │ To Acquire Combat Information & Intell │
       └───────────────────────────────────┘
 Systems:
   ┌─────────────────────┐   ┌─────────────────────┐
   │ TRUCK, UTIL, 1/4T   │   │ RADIO SET, AN/URC-46│
   │ TLR. CGO, 1/4T      │   │ TLR. CGO 1 1/2T     │
   │                     │   │                     │
   │                     │   │                     │
   │                     │   │                     │
   │                     │   │                     │
   │                     │   │                     │
   └─────────────────────┘   └─────────────────────┘
```

Figure 30. Screen allowing materiel systems to be entered.

WARNING: If the user enters any letters other than "Y" or "N" in response to the message box, an error message will appear. Should this happen, press any key as prompted, followed by "Y" or "N".

˜E: While functions had to be selected for each
mission essential task identified in the FDM of the
MFS, the specification of function requirements was
optional.   If the user did not enter information into
the function specification menus, they will be blank
when presented for review in the Materiel System
Identification Module.

> (3)   Enter the names or identification of
>   materiel systems capable of satisfying the
>   requirements of the selected function.   The
>   names of up to 32 different materiel systems
>   can be entered into the data fields shown in
>   Figure 30.   If more than 32 materiel systems
>   are to be identified for the selected
>   function, the user can press <PgDn> after
>   entering the names of 32 systems and a second
>   screen will be displayed into which up to
>   another 32 system names can be entered.

IMPORTANT: Be sure to press <F3> and save the unit
file after every substantial input of data.

> (4)   When all the appropriate materiel systems
>   have been identified for the selected
>   function, pressing <PgDn> causes the
>   redisplay of the function selection menu (see
>   Figure 29).   Repeat steps (1) through (3)
>   until candidate materiel systems have been
>   identified for all mission required
>   functions.

WARNING: SORD will not allow the user to select a
function if it has already been selected, i.e., if an
asterisk already appears next to that function.
Attempting to do so will cause an error message to
appear.

Identify personnel specialties in conjunction with materiel systems

The user may elect to identify candidate personnel
in close temporal proximity with identifying candidate
materiel systems.   This may be accomplished by
appropriate use of the <PgUp> and <PgDn> keys to move
between UDS modules.   For example, after selecting a
function and identifying candidate materiel systems in
the MSIM, the user can press <PgUp> to access the UDS
Main Menu from which the PIM can be accessed.   After
selecting the same function, the user can identify
candidate personnel specialties.   Then, pressing <PgUp>
will again bring the user back to the UDS Main Menu
from which the MSIM can be selected and another
function selected.

Identify personnel crews for materiel systems

The user may use the Crew/Cell Data Base option of the SORD Main Menu to designate personnel that comprise the crew assigned to a crew-served materiel system. Using this option, described in detail below, the user can organize groups of personnel and then assign them as needed to materiel systems. If a crew is so assigned to a materiel system, every time that materiel system is identified as a candidate for assignment to a unit, the personnel in the assigned crew will also be identified. This method of identifying crew personnel, however, will not cause the crew personnel to be automatically listed as candidate personnel specialties in the PIM.

Edit identification of candidate materiel systems

The user can edit the materiel systems identified for a previously selected function by performing the following steps:

(1)   Press <PgUp> to return to the MSIM main menu as shown in Figure 28.

(2)   Once in the MSIM Main Menu, select "Identify Materiel Systems". The function list will appear without asterisks next to any functions. The user may then select any function, and change or edit the list of materiel systems that was entered.

Display Summary of Candidate Materiel Systems

After the user has entered candidate materiel systems for all functions listed in the function selection menu, pressing <PgDn> will cause the summary screen illustrated in Figure 31 to be displayed. This summary screen lists in alphabetical order all the candidate materiel systems designated by the user. This is the same summary screen that is displayed when the "Display Materiel Systems Identified" option of the MSIM Main Menu is selected.

```
SORD-UDS-MSIM-DIMS    ┌──────┐
┌────────────────────────────────────────┐
│ ┌────────────────────────────────────┐ │
│ │ Display of Identified Material Systems │ │
│ └────────────────────────────────────┘ │
│                                          │
│ ┌──────────────────┐  ┌──────────────┐  │
│ │ TRUCK, UTIL, 1/4T │  │              │  │
│ │ TLR, CGO, 1/4T    │  │              │  │
│ │ RADIO SET, AN/URC-46 │  │           │  │
│ │ TLR. CGO 1 1/2T   │  │              │  │
│ │                   │  │              │  │
│ │                   │  │              │  │
│ │                   │  │              │  │
│ └──────────────────┘  └──────────────┘  │
└────────────────────────────────────────┘
```
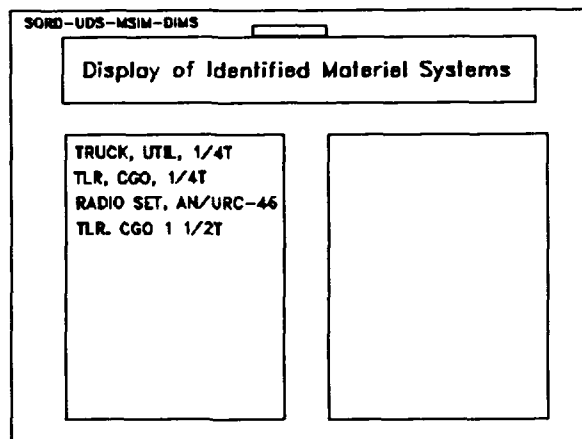
Figure 31. Materiel systems
summary screen.

The Personnel Identification Module (PIM)

This module, working in the same manner as the
MSIM, assists the user in identifying personnel
specialties that are to be considered for inclusion in
the unit. Because of the similarity of purpose and
procedures used for the MSIM and PIM, the remainder of
this PIM section of the SORD User's Manual paraphrases
the information previously given in the MSIM section.
The PIM procedure involves identifying those personnel
specialties best able to perform the functions
specified in the function determination module of the
MFS. Selecting the "Personnel Identification Module"
option in the UDS Main Menu causes display of the PIM
Main Menu, illustrated in Figure 32. The PIM Main Menu
has four options. One permits the user to identify
candidate personnel that have the capability to meet
functional requirements of the unit's mission. The
personnel identified in the PIM do not ultimately have
to be incorporated into the unit design. They can be
ignored later when the numbers of each personnel
specialty are specified. The other three options
permit the user to (a) view a summary display of the
personnel already identified, (b) return to the MFS
Main Menu, or (c) return to the SORD Main Menu.

```
┌─────────────────────────────────────────┐
│ SORD-UDS-PIM-MENU                        │
├─────────────────────────────────────────┤
│                                          │
│      Unit Design Subsystem (UDS)         │
│   Personnel Identification Module (PIM)  │
│                                          │
├─────────────────────────────────────────┤
│              PIM Main Menu               │
├─────────────────────────────────────────┤
│                                          │
│         Identify Personnel               │
│                                          │
│         Display Personnel Identified     │
│                                          │
│         Unit Design Subsystem Menu       │
│                                          │
│         SORD Main Menu                   │
│                                          │
└─────────────────────────────────────────┘
```

Figure 32. PIM Main Menu.

Identify Personnel Specialties for Specified Mission Functions

Upon selecting the "Identify Personnel" option of the PIM Main Menu, a screen for selecting functions is displayed that is similar to the one encountered in the MSIM and illustrated in Figure 29. This screen prompts the user to choose a function from the list of functions previously selected in the FDM of the MFS.

To select a function and identify personnel specialties having the capability to satisfy the requirements of that function, the following actions need to be taken by the user.

(1)   Once in the screen similar to that illustrated in Figure 29, press the <**Return**> or <**Shift**>-<**Tab**> keys to move the cursor next to the function for which candidate personnel specialties are to be identified. Press any key and an asterisk will appear in the box to indicate the function has been selected.

(2)   Pressing <**PgDn**> causes the input screen illustrated in Figure 33 to be displayed along with a message box asking if the user wishes to review the qualitative and quantitative requirements of the selected function. These function requirements are those specified in the FDM of the MDS. If the user enters "**Y**" in response to this prompt, control of the screen will transfer to the function specification screens of the

FDM. Pressing <PgDn> repeatedly will enable the user to review the requirements specified on these screens. After reviewing all the function specification screens for the selected function, or if the user enters "N" in response to the prompt, the screen illustrated in Figure 33 for entering the name of candidate personnel specialties will be displayed, without the overlaying message box.

Figure 33. Screen allowing personnel to be entered.

WARNING: The user must enter either "Y" or "N" in response to the box asking whether a review of the function specification screens is desired, otherwise an error message will appear. Should this happen, press any key as prompted, followed by "Y" or "N".

NOTE: While functions had to be selected for each mission essential task identified in the Function Definition Module of the MFS, the specification of function requirements was optional. If the user did not enter information into the function specification menus, they will be blank when presented for review in the Personnel Identification Module.

    (3)   Enter the Military Occupational Specialty (MOS) codes and standard job titles of personnel capable of satisfying the requirements of the selected function. The names of up to 36 different candidate personnel specialties can be entered into the data fields shown in Figure 33. If more than

36 personnel specialties are to be identified
for the selected function, the user can press
<PgDn> after entering 36 specialties and a
second screen will be displayed into which up
to another 36 specialties can be entered.

**IMPORTANT: Be sure to press <F3> and save the unit
file after every substantial input of data.**

(4) When all the appropriate personnel
specialties have been identified, pressing
<PgDn> causes the redisplay of the function
selection menu (see Figure 29). Repeat steps
(1) through (3) until candidate personnel
specialties have been identified for all
mission required functions.

**WARNING: SORD will not allow the user to select a
function if it has already been selected. (That is, if
an asterisk appears next to that function). Attempting
to do so will cause an error message to appear.**

Identify materiel systems in conjunction with personnel specialties

The user may elect to identify candidate materiel
systems for the unit in close temporal proximity with
identifying personnel specialties. This may be
accomplished by appropriate use of the <PgUp> and
<PgDn> keys to move between UDS modules. For example,
after selecting a function and identifying candidate
personnel in the PIM, the user can press <PgUp> to
access the UDS Main Menu from which the MSIM can be
accessed. After selecting the same function, the user
can identify candidate materiel systems. Then,
pressing <PgUp> will again bring the user back to the
UDS Main Menu from which the PIM can be selected and
another function selected.

Identify personnel as crews for materiel systems

The user may use the Crew/Cell Data Base option of
the SORD Main Menu to designate personnel that comprise
the crew assigned to a materiel system. Using this
option, described in detail below, SORD causes
personnel associated with a crew-served materiel system
to be automatically identified as candidates for
assignment to the unit whenever that materiel system
is identified as a candidate for assignment to the
unit. This method of identifying crew personnel,
however, will not cause the crew personnel to be
automatically listed as candidate personnel specialties
in the PIM.

Edit identification of candidate personnel specialties

The user can edit personnel specialties data that were entered for a previously selected function by performing the following steps:

(1)   Press <PgUp> to return to the PIM main menu as shown in Figure 32.

(2)   Once in the PIM Main Menu, select "Identify Personnel". The function list will appear without asterisks next to any functions. The user may select any function.

Display Summary of Candidate Personnel Specialties

After the user has entered candidate personnel specialties for all functions listed in the function selection menu, pressing <PgDn> will cause a summary screen to be displayed. This summary screen lists in numeric and alphabetical order all the candidate personnel specialties designated by the user. This is the same summary screen that is displayed when the "Display Personnel Identified" option of the PIM Main Menu is selected.

The Unit Sizing Module (USM)

The MSIM and PIM allow the user to specify materiel systems and personnel specialties, respectively, having the capability necessary to satisfy the functional requirements specified for mission essential tasks. The Unit Sizing Module assists the user in specifying how many of which specific types of those candidate materiel systems and personnel specialties will actually be assigned to the unit.

Selecting the "Unit Sizing Module" option of the UDS Main Menu causes display of the USM Main Menu, illustrated in Figure 34. There are seven options available to the user in this main menu: one each for assigning materiel and personnel to the unit, one each for viewing a summary of the results of assigning materiel and personnel to the unit, one for returning to the UDS Main Menu, and one for returning to the SORD Main Menu. Finally, there is an option allowing the user to assign predesignated cells of personnel and materiel to the unit. With the exception of the two

```
┌─────────────────────────────────────────────┐
│ SORD-UDS-USM-MENU                            │
├─────────────────────────────────────────────┤
│          Unit Design Subsystem (UDS)         │
│          Unit Sizing Module (USM)            │
├─────────────────────────────────────────────┤
│               USM Main Menu                  │
├─────────────────────────────────────────────┤
│          Assign Materiel Systems             │
│          Assign Personnel                    │
│          Assign Cells                        │
│          Display Materiel Systems            │
│          Display Personnel                   │
│          Unit Design Subsystem Menu          │
│          SORD Main Menu                      │
└─────────────────────────────────────────────┘
```

Figure 34. USM Main Menu.

options for returning to higher level main menus, each of these options is described in succeeding sections of this user's manual.

Assign Materiel Systems

If the "Assign Materiel Systems" cption of the USM Main Menu is selected, a function selection menu is displayed that is similar to the one illustrated in Figure 29 on page 39. Following the procedures described in conjunction with Figure 29, a function is selected. Then, upon pressing <PgDn>, the screen illustrated in Figure 35 is displayed along with a message box asking if the user wishes to review the qualitative and quantitative requirements of the selected function. This is the same message box and has the same purpose as the ones described in conjunction with the MSIM and PIM. The function requirements referred to are those specified in the Function Definition Module of the MFS. If the user enters "Y" in response to this prompt, control of the screen will transfer to the function specification screens of the FDM. Pressing <PgDn> repeatedly will enable the user to review the requirements specified on these screens for each task for which the identified function was selected.

After reviewing all the function specification screens for the selected function, or if the user enters "N" in response to the prompt, the screen illustrated in Figure 35 for assigning materiel systems will be displayed without the overlaying message box. The screen used for assigning materiel systems will

Figure 35. Screen allowing the assignment of materiel systems.

list, under the label "SYSTEMS", the materiel systems previously identified in the MSIM as having the capability to satisfy the requirements of the specified function. To assign materiel systems to the unit the following steps need to be performed.

(1) The user presses the <Return> or <Shift>-<Tab> keys to move the cursor in front of the materiel system of interest.

(2) The user then enters, in the column labelled "QTY", the desired number of that materiel system to be assigned to the unit.

WARNING: Do not use the space bar or leading zeros to right justify the values entered into the "QTY" column of the "Assign Materiel Systems" screen. SORD scans the left-most column to determine which candidate materiel systems have actually been assigned to the unit.

NOTE: All the materiel systems assigned to the unit in the USM are presumed to be necessary for the unit to satisfy the functional requirements of its mission. Consequently, all of these assigned materiel systems must be, in turn, assigned to an element at the lowest organizational level of the unit structure.

(3) Pressing <Return> moves the cursor to the column labelled "CREW". If this materiel system has a predesignated personnel crew (see a description of the Crew Data Base below), and the user wishes to use that crew

with the designated materiel system, the user presses any key to put an asterisk in the "CREW" column.

NOTE: As mentioned previously, the user may use the Crew/Cell Data Base option of the SORD Main Menu to designate personnel that comprise the crew assigned to a materiel system. Using this option, described in detail below, SORD causes personnel associated with a crew-served materiel system to be automatically assigned to the unit whenever that materiel system is assigned to the unit. This method of assigning crew personnel, however, will not cause the crew personnel to be automatically listed as assigned to the unit in the "Display Personnel" screen of the USM.

(4)   Pressing <Return> a second time moves the cursor to the column labelled "NOTE". If the user wishes to include a message concerning the assignment of this particular materiel system in the audit trail for the emerging URS, pressing any key puts an asterisk in this column. Pressing <PgDn> will display a note screen into which the message can be entered. After entering the message in the note screen, pressing <PgDn> again, returns the user to the screen for assigning materiel systems.

If other materiel systems are also to be assigned to the unit in order to meet the requirements of the selected function, repeat steps (1) through (4) as many times as necessary. After all the desired numbers of different materiel systems have been assigned to meet the requirements of one function, pressing <PgDn> causes the Function Selection menu to be displayed, so that another function may be selected.

Assign personnel in conjunction with materiel systems

As was in case for identifying candidate materiel systems and personnel specialties, the user may elect to assign materiel systems and personnel specialties in parallel or at the same point in time, rather than assigning all materiel systems to the unit and then all personnel specialties. To do the former, the user follows the steps outlined above for the MSIM and PIM. In short, the user presses <PgUp> and <PgDn> to move back and forth between the "Assign Materiel Systems" and "Assign Personnel" modules.

Display Summary of Assigned Materiel System

When all desired materiel systems have been assigned to all functions, pressing <PgDn> causes the display of a summary screen which lists the name and quantity of each type of materiel system assigned to the unit, along with asterisks to indicate if there are any associated cells and notes. This is the same summary screen that is displayed if the user selects the "Display Materiel Systems" option of the USM Main Menu. If a materiel system had been identified as a candidate for assignment in the MSIM, but no quantity for that system is entered in the USM, the name of that materiel system will not be included in the summary screen.

Assign Personnel

The "Assign Personnel" and "Display Personnel" options of the USM Main Menu work in the same manner as those which address the assignment and display of materiel systems. They will assist the user in specifying how many of which specific personnel specialties will actually be assigned to the unit. Because of the similarity of purpose and procedures used for these two sets of options, the remainder of this and the next sections paraphrase the instructions given above in the sections addressing the assignment and display of materiel systems.

If the "Assign Personnel" option of the USM Main Menu is selected, a function selection menu is displayed that is similar to the one illustrated in Figure 29. Following the procedures described in conjunction with Figure 29, a function is selected. Then, upon pressing <PgDn>, the screen illustrated in Figure 36 is displayed along with a message box asking if the user wishes to review the qualitative and quantitative requirements of the selected function. This is the same message box and has the same purpose as the one described in conjunction with the MSIM and PIM options of the UDS Main Menu. The function requirements referred to are those specified in the FDM of the MFS. If the user enters "Y" in response to this prompt, control of the screen will transfer to the Function Specification screens of the FDM. Pressing <PgDn> repeatedly will enable the user to review the requirements specified on these screens for each task for which the identified function was selected.

After reviewing all the function specification screens for the selected function, or if the user enters "N" in response to the prompt, the screen illustrated in Figure 36 for assigning personnel will be displayed, without the overlaying message box.

Figure 36. Screen allowing the desired number of personnel to be specified.

The screen used for assigning personnel will list, under the label "PERSONNEL" and "JOB TITLE", the MOS codes and standard job titles of personnel previously identified in the PIM as having the capability to satisfy the requirements of the specified function. To assign personnel to the unit the following steps need to be performed.

(1) The user presses **<Return>** or **<Shift>-<Tab>** until the cursor is in front of the personnel specialty of interest.

(2) The user then enters, in the column labelled "QTY", the desired number of that personnel specialty to be assigned to the unit.

WARNING: Do not use the space bar or leading zeros to right-justify the values entered into the "QTY" column of the "Assign Personnel" screen. SORD scans the left-most column to determine which candidate personnel specialties have actually been assigned to the unit.

NOTE: All the personnel specialties assigned to the unit in the USM are presumed to be necessary for the unit to satisfy the functional requirements of its mission. Consequently, all of these assigned personnel specialties must be, in turn, assigned to an element at the lowest organizational level of the unit structure.

(3)   Pressing <Return> moves the cursor to the column labelled "NOTE". If the user wishes to include a message concerning that assignment of this particular personnel specialty in the audit trail for the emerging URS, pressing any key puts an asterisk in this column. Pressing <PgDn> will display a note screen into which the message is entered. After entering the message in the note screen, pressing <PgDn> again, returns the user to the screen for assigning personnel specialties.

If other personnel specialties are also to be assigned to the unit to meet the requirements of the selected function, the user continues as described in steps (1) through (3) above. After all the desired numbers of different personnel specialties have been assigned to meet the requirements of one function, pressing <PgDn> causes the Function Selection menu to be displayed, so that another function may be selected.

Assign materiel systems in conjunction with personnel

As was in case for identifying candidate materiel systems and personnel specialties, the user may elect to assign materiel systems and personnel specialties in parallel or at the same point in time, rather than assigning all materiel systems to the unit and then all personnel specialties. To do the former, the user follows the steps outlined above for the MSIM and PIM. In short, the user presses <PgUp> and <PgDn> to move back and forth between the "Assign Materiel Systems" and "Assign Personnel" modules.

Display Summary of Assigned Personnel Specialties

When all desired personnel specialties have been assigned to all functions, pressing <PgDn> causes the display of a summary screen which lists the quantity of each type of personnel specialty assigned to the unit, along with asterisks to indicate if there are any associated notes. This is the same summary screen that is displayed if the user selects the "Display Personnel" option of the USM Main Menu. If a personnel specialty had been identified as a candidate for assignment in the PIM, but no quantity for that personnel specialty is entered in the USM, the MOS and standard job title of that personnel specialty will not be included in the summary screen.

NOTE: Personnel assigned to the unit in the "Assign Materiel Systems" screen using the crew option of the crew/cell data base will not be shown in the summary display of assigned personnel. Their presence in the unit will not be shown in the SORD display until the user enters the Constraints Application Module.

Assign Cells

This option of the USM Main Menu allows the user to assign predesignated cells or clusters of materiel and personnel to the unit to satisfy selected functional requirements of the unit. Using these cells as organizational building blocks during the design of a unit can be more efficient than separately addressing each materiel system and each personnel specialty. Specifically, if a particular collection of materiel and personnel assets are needed to perform the same function, both within and across missions and units, it is preferable to define this cell of assets once for subsequent repeated assignments rather than repeatedly defining each asset in the cell each time it is required. For example, the user may wish to establish, say, a mess section or a maintenance team to satisfy the requirements specified for certain combat service support functions.

The process of defining and naming cells, and the designation of assets which constitute a given cell is addressed in the data base option of the SORD Main Menu. Using that option, described in detail below, the user can develop a library of cells that can be called up and assigned to any unit that requires the capabilities built into the different cells.

Once created and stored in the Crew/Cell Data Base, the procedure for assigning cells to the unit is similar to that described above for assigning materiel and personnel assets.

If the "Assign Cells" option of the USM Main Menu is selected, a function selection menu is displayed that is similar to the one illustrated in Figure 29. Following the procedures described in conjunction with Figure 29, a function is selected. Then, upon pressing <PgDn>, the screen illustrated in Figure 37 is displayed along with a message box asking if the user wishes to review the qualitative and quantitative requirements of the selected function. This is the same message box and has the same purpose as the one described in conjunction with the MSIM, PIM, and the materiel and personnel assignment options of the UDS Main Menu. After reviewing all the function specification screens for the selected function, or if the user enters "N" in response to the prompt, the

screen illustrated in Figure 37 for assigning cells will be displayed, without the overlaying message box.

Figure 37. Screen allowing the assignment of cells.

The screen used for assigning cells screen will list, under the label "CELLS", the names of the cells that had been previously created. To assign a cell to the unit the following steps need to be performed.

(1) The user presses **<Return>** or **<Shift>-<Tab>** until the cursor is in front of the cell name of interest.

(2) The user then enters, in the column labelled "QTY", the desired number of those cells to be assigned to the unit.

WARNING: Do not use the space bar or leading zeros to right-justify the values entered into the "QTY" column of the "Assign Cells" screen. SORD scans the left-most column to determine which candidate cells have actually been assigned to the unit.

NOTE: All the personnel specialties and materiel systems assigned to the unit in the USM are presumed to be necessary for the unit to satisfy the functional requirements of its mission. This includes those personnel and materiel assets that are assigned to the unit by virtue of their being designated as part of a cell that is assigned to the unit. Consequently, all of the cells assigned to the unit must be, in turn, assigned to an element at the lowest organizational level of the unit structure.

(3)   Pressing <PgDn> returns the user to the
       screen for assigning cells. If other cells
       are also to be assigned to the unit to meet
       the requirements of the selected function,
       the user continues as described in Steps (1)
       through (2) above.

After all the desired numbers of different cells
have been assigned to meet the requirements of one
function, pressing <PgDn> causes the Function Selection
menu to be displayed, so that another function may be
selected. When all desired cells have been assigned to
all functions, pressing <PgDn> causes the USM Main Menu
to be displayed.

**Note: Personnel and equipment assigned to the unit
using the assign cell option of the USM will not be
shown in the summary displays of assigned personnel and
materiel. Their presence in the unit will not be shown
in a SORD display until the user enters the Constraints
Application Module.**

After assigning the numbers and types of materiel
and personnel assets necessary to meet the requirements
of the mission, there is still more work to be
accomplished. The user now must organize these assets
into appropriate first level organizational entities
and develop a structural hierarchy, staffed with
appropriate numbers of staff personnel, to provide
necessary command and control functions. These unit-
level command and control functions are separate from
and should be evaluated in addition to the functions
required for the unit to meet its mission requirements.
The SORD process to aid the user in designing this
structured hierarchy is described in the next section.

The C2 and Structure Development Module (C2M)

Using the Materiel and Personnel Identification
Modules the user is able to identify assets that could
give the unit the capability to meet its mission
requirements. Using the Unit Sizing Module the user is
able to choose among these candidate assets to specify
how many of which specific materiel systems and personnel
specialties will actually be assigned to the unit. What
remains is for the user to organize these assets into
appropriate first level organizational entities and then
to assign and structure the personnel required to provide
the necessary command and control capabilities. The C2
and Structure Development Module (C2M) of the UDS will
aid the user in accomplishing these tasks.

Selecting the "C2 and Structure Development Module" option of the UDS Main Menu causes display of the C2M Main Menu, illustrated in Figure 38. This menu has five options. In addition to one each for returning to the UDS and SORD Main Menus, there are the following options: (a) one for the bottoms-up process of allocating all assigned assets to lowest level organizational elements and then, in succession, assigning lower level elements to higher level elements; (b) one for assigning C2 personnel to each organizational element in succession; and (c) one which will draw a diagram of the hierarchical organizational structure. Succeeding paragraphs will describe each of the latter three options.

```
+---------------------------------------------------+
| SORD-UDS-USM-MENU                                 |
|---------------------------------------------------|
|                                                   |
|          Unit Design Subsystem (UDS)              |
|     C2 and Structure Development Module (C2M)     |
|                                                   |
|---------------------------------------------------|
|                                                   |
|              C2M Main Menu                        |
|                                                   |
|---------------------------------------------------|
|       Develop Organizational Structure            |
|       Assign C2 or Support Personnel              |
|       Look at Organizational Structure            |
|       Unit Design Subsystem Menu                  |
|       SORD Main Menu                              |
|                                                   |
+---------------------------------------------------+
```

Figure 38. C2 and Structure Development Module Main Menu.

Develop Organizational Structure

Name and assign assets to basic organizational elements

Selecting the "Develop Organizational Structure" option of the C2M Main Menu initially causes a repeating series of five different screens to be presented to the user. These screens assist the user in naming and assigning all mission essential materiel and personnel assets to the lowest level in the unit's hierarchical structure. (SORD allows only command, control, and other purely support personnel to be assigned to hierarchical levels higher than the lowest level.) Succeeding paragraphs describe these five screens.

(1)   The first of the repeating series of five
        screens is illustrated in Figure 39. This
        screen prompts the user to provide a name and
        abbreviated (4 character) name for one of the
        lowest level organizational elements of the
        unit.   As illustrated in Figure 39, the user
        should enter **"TECH SPT SEC"**, press **<Return>** to
        move the cursor, enter **"TECH"** as the
        abbreviated element name, and finally, press
        <PgDn> to display the next screen.

```
SORD-USA-CAM-BE      ┌──────────┐
┌────────────────────┴──────────┴────────────┐
│     Specify Basic Element of Unit           │
├─────────────────────────────────────────────┤
│  ENTER THE NAME OF THE LOWEST LEVEL ORGANIZATIONAL
│  ELEMENT OF THE UNIT.  THE LEVEL WILL BE REFERRED
│  TO AS LEVEL 1
│
│
│          ELEMENT: │ TECH SPT SEC │
│
│   ABBREVIATED NAME OF ELEMENT:   │TECH │
│   (FOUR CHARACTERS)
│
└─────────────────────────────────────────────┘
```

Figure 39. Screen allowing level
1 organizational elements to be
named.

NOTE: The user may name a predesignated cell of
materiel systems and personnel specialties as a basic
element in the hierarchy of the unit.   To do so, simply
use the name of the cell as the name of a basic element
in the screen illustrated in Figure 39.   This cell name
is the name given the cell when it was created in the
Crew/Cell Data Base and when it is accessed in the
"Assign Cells" option of the USM Main Menu.   When a cell
is named as a basic element in the unit structure its
materiel and personnel assets will not be listed as
available for assignment to the basic element (see steps
(2) and (3) below.   If the user wishes to review or
change the assets assigned to a cell, the user must
access the Crew/Cell Data Base from the SORD Main Menu.

(2)   The second screen, illustrated in Figure 40,
        assists the user in assigning materiel systems
        to the organizational element just identified.
        The newly created element appears in the box
        marked "ELEMENT" and the level of this element
        appears in the box marked "LEVEL".   The screen

illustrated in Figure 40 lists, in the box
labeled "SYSTEM", the types of materiel systems
required to accomplish the unit's mission.
These systems were identified while in the MSIM
of the UDS.   The box labeled "QTY AVL"
contains the available quantities of each type
of materiel system.   These quantities of
systems are the numbers required for the unit
to accomplish its mission and were specified in
the "Assign Materiel Systems" option of the
USM.   In the column marked "QTY ASSN", the
user is prompted to specify how many of these
available (and required) materiel assets are to
be assigned to the organizational element
designated in Figure 40.   Figure 40 shows

ASSIGN MATERIEL SYSTEMS TO THE BASIC ELEMENT screen:

SORD-UDS-CAM-AMS

Assign Materiel Systems to the Basic Element

ELEMENT: TECH SPT SEC   LEVEL [1]

QTY AVL	QTY ASSN	SYSTEM	QTY AVL	QTY ASSN	SYSTEM
3	1	TRUCK, UTIL, 1/4T			
1		TLR, CGO 1/4T			
6	4	RADIO SET, AN/URC-46			
1		TLR, CGO 1 1/2T			

Figure 40.   Screen allowing materiel
systems to be assigned to level 1
organizational elements.

that, in the example unit, one of the three
available 1/4 T Utility trucks and four of the
available AN/VRC-46 radios sets are assigned to
the element named "TECH SPT SEC".   After
assigning materiel systems to the element, the
user should press <PgDn> to display the next
screen.

NOTE: The user should remember that the assignment of
some materiel systems to the basic element will cause
their personnel crews also to be assigned to the element.
These are the materiel systems which had previously been
assigned a predesignated crew in the Unit Sizing Module.

IMPORTANT: Do not assign more resources than are listed in the "QTY AVL" column. Doing so will cause an error message to appear.

(3) The third screen, illustrated in Figure 41, assists the user in assigning personnel specialties to the organizational element in the same manner as the previous screen did for materiel assets. As shown in Figure 41, the screen shows the name of the element, its level in the hierarchy, and the numbers and types of personnel assets required for the unit to accomplish its mission. The illustration shows that, for the example unit, the one required "915 AO UNIT MAINT TECH" and both of the "635 20 HVY WHL VE MECH" specialists are assigned to the first level element named "TECH SPT SEC". After assigning personnel specialties to the element, the user presses <PgDn> to display the next screen.

```
SORD-UDS-CAM-AS         [    ]
| Assign Other Personnel to the Basic Element |
ELEMENT : |TECH SPT SEC        |  LEVEL: [1]

QUANTITY   QUANTITY
AVAILABLE  ASSIGNED   PERSONNEL    JOB TITLE

  1          1        915 AO       UNIT MAINT TECH
  1                   63B 40       MOTOR SARGEANT
  1                   62B 20       CONST EQUIP REP
  2          2        635 20       HVY WHL VE MECH
```

Figure 41. Screen allowing personnel to be assigned to level 1 organizational elements.

NOTE: As was in case for identifying and assigning materiel systems and personnel specialties, the user may elect to assign materiel systems and personnel specialties to the lowest level elements of the unit organizational structure in parallel or at the same point in time, rather than assign all materiel systems and then all personnel specialties. To do the former, the user follows the steps outlined above for the MSIM, PIM, and

USM.   In short, the user presses <PgUp> and <PgDn> to move back and forth between the "Assign Materiel Systems to the Basic Element" and "Assign Personnel to the Basic Element" screens.

IMPORTANT: Be sure to press <F3> and save the unit file after every substantial input of data.

(4)   The fourth screen, illustrated in Figure 42, presents to the user a summary of the assignments that have been made to the specified basic element of the unit. The user should review these assignments and, if necessary move back to the assign assets screens to make necessary changes before proceeding.   After reviewing and confirming the composition of the designated basic element, the user presses <PgDn> to proceed.

Figure 42.   Basic element summary.

(5)   The fifth and final screen for assigning assets to the designated basic element is illustrated in Figure 43.   This screen allows the user to assign and create additional basic elements with the same name and assets as the element created in the preceding four screens. The screen identifies the name of the element and the number of personnel assigned to the element.   The user is to enter the number of these basic elements that are to be located at the lowest level of the organizational structure.   The user must also enter a "Y" or

```
SORD-UDS-CAM-BE        ┌──┐

  ┌────────────────────────────────────┐
  │  Specify Number of Elements  │
  └────────────────────────────────────┘


  Element     ┌──────────────────┐
              │ TECH SPT SEC     │
  HAS  ┌─┐    └──────────────────┘
       │3│    PERSONNEL ASSIGNED
       └─┘


  HOW MANY  ┌──────────────┐   ELEMENTS
            │ TECH SPT SEC │
            └──────────────┘
  SHOULD BE AT THIS LEVEL?  ┌─┐
                            │2│
                            └─┘


  DO YOU WISH TO DEVELOP ANOTHER LEVEL 1
  ELEMENT WITH A DIFFERENT COMPOSITION  (Y/N)  ┌─┐
                                               │Y│
                                               └─┘
```

Figure 43.   Screen allowing additional level 1 elements to be created.

"N" response to the prompt asking if other Level 1 elements with a different composition are to be created.

IMPORTANT: Assignments to Level 1 organizational structures are constrained by the availability of materiel and personnel resources.   In other words, items that do not exist cannot be assigned.   For example, Figure 40 (materiel systems) shows that there is only one of the materiel system "TLR, CGD 1/4T" available.   Therefore, it would not be possible to create more than one organizational unit containing that resource.   Conversely all materiel and personnel resources in the "QTY AVL" column must be allocated.   If the user attempts to assign more resources than are available, an error message will appear.   Similarly, typing "N" to indicate that no other level 1 elements are to be created before having used up all materiel systems and personnel will also display an error message.   If the user types "Y" to the last prompt illustrated in Figure 43, that is, if the user indicates that another Level 1 element is to be created from available resources, and then presses <PgDn>, SORD returns the user to the screen illustrated in Figure 39.   The user then repeats the procedures outlined in Steps (1) through (5) above.   The quantities of materiel systems and personnel specialties listed as available in the slides illustrated in Figures 40 and 41 will reflect assignments made to previously developed basic elements. In other words, previously assigned materiel systems will no longer be available.

When the user has assigned all the available and necessary materiel and personnel to the lowest level of the organizational hierarchy, i.e., when only zero values are shown in the "QTY AVL" columns of Figures 40 and 41, pressing "N" in response to the last prompt illustrated in Figure 43, and then <PgDn> will cause the screen illustrated in Figure 44 to be displayed.

Name and create higher-level organizational elements in the unit hierarchy

The screen illustrated in Figure 44 enables the user to create the hierarchical structure of the unit organization. The screen tells the user which level of the hierarchy is being designed. In the illustrated example, the user has named and specified the composition of all basic, Level 1 elements. Therefore, the screen specifies that the next element to be designed is at Level 2 in the hierarchy. The screen also provides a list of the lower level elements that have already been specified. The user is prompted to enter a name and an abbreviated 4-character name for the new second-level element. Here the user can enter the name "HQ PLATOON" and "HQ P" as illustrated, and then press <PgDn> to display the next screen.

```
 SORD-UDS-CAM-HLE      [         ]

   Specify Higher Level Element

 SPECIFY THE NAME OF THE LEVEL [2]  ELEMENT OF THE UNIT
      ELEMENT : |HQ PLATOON        |

 ENTER FOUR CHAR. ABBREVIATED TITLE OF ELEMENT :[HQ P]
      ELEMENTS ALREADY SPECIFIED        LEVEL

      | TECH SPT SEC   |              | 1  |
      | MAINTENANCE SEC|              | 1  |
```

Figure 44. Screen allowing higher level organizational elements to be specified.

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The second screen for specifying higher level elements is illustrated in Figure 45. This screen lists the names and levels of previously specified (lower level)

Figure 45. Screen allowing the assignment of lower level organizational elements to higher level organizational elements.

elements, and the quantity of those elements available for assignment to the named higher level element. The user is prompted to specify how many of the available elements are to be assigned to the specified higher level element. In the example, each of the two available Level 1 elements is assigned to the Level 2 element named, "HQ PLATOON". At the bottom field of the screen the user is prompted to indicate whether another upper-level element is to be designated. The user enters either the number of the hierarchical level of the next element that is to be specified, or "N", to indicate that no further elements are to be designated and that the design of the organizational structure is completed. In the illustrated example, a "3" is entered to indicate that a level-three organizational element is to be created. Pressing <PgDn> causes the screen illustrated in Figure 46 to be displayed.

```
SORD-UDS-CAM-HLE         [        ]
┌─────────────────────────────────────────┐
│        Specify Higher Level Element      │
├─────────────────────────────────────────┤
│ SPECIFY THE NAME OF THE LEVEL [3] ELEMENT OF THE UNIT
│       ELEMENT : [COMPANY        ]
│ ENTER FOUR CHAR. ABBREVIATED TITLE OF ELEMENT : [CO ]
│     ELEMENTS ALREADY SPECIFIED      LEVEL
│   ┌──────────────────────┐        ┌────┐
│   │ HQ PLATOON           │        │ 2  │
│   │ TECH SPT SEC         │        │ 1  │
│   │ MAINTENANCE SEC      │        │ 1  │
│   │                      │        │    │
│   └──────────────────────┘        └────┘
└─────────────────────────────────────────┘
```

Figure 46.   Screen   allowing
higher level organizational
elements to be named.

As can be seen in Figure 46, the new screen
presents an update of the information previously displayed
and illustrated in Figure 44. Specifically, the screen
illustrated in Figure 46 specifies that the new element
to be designed is at Level 3 in the hierarchy and
provides a list of the lower level elements that have
already been specified. This list includes the Level 2
element named, "HQ PLATOON". The user is prompted to
enter a name and an abbreviated 4-character name for the
new third-level element. Here, the user can enter the
name "COMPANY" and "CO" as illustrated. Then, pressing

```
SORD-UDS-CAM-AE          [        ]
┌─────────────────────────────────────────┐
│   Assign Elements To Higher Level Element │
├─────────────────────────────────────────┤
│ HIGHER ELEMENT : [COMPANY        ] LEVEL [2]
│ QUANTITY  QUANTITY                       
│ AVAILABLE ASSIGNED        NAME        LEVEL
│ ┌──┐    ┌──┐    ┌──────────────┐    ┌──┐
│ │1 │    │1 │    │ HQ PLATOON   │    │2 │
│ │  │    │  │    │              │    │  │
│ │  │    │  │    │              │    │  │
│ │  │    │  │    │              │    │  │
│ └──┘    └──┘    └──────────────┘    └──┘
│ ENTER LEVEL OF NEXT ELEMENT OR 'N' IF UNIT IS COMPLETE [N]
└─────────────────────────────────────────┘
```

Figure 47.   Screen allowing the
assignment   of   lower   level
organizational elements to higher
level organizational elements.

<PgDn> causes the screen illustrated in Figure 47 to be
presented. This screen lists the names, levels, and
quantities available of previously specified lower level
elements. The user is prompted to specify how many of
the available elements are to be assigned to the
specified higher level element. In the illustrated
example, the one available Level 2 element is assigned to
the Level 3 element named, "COMPANY". At the prompt at
the bottom of the screen illustrated in Figure 47, the
user enters "N", to indicate that no further elements are
to be designated and that the design of the
organizational structure is completed. Pressing
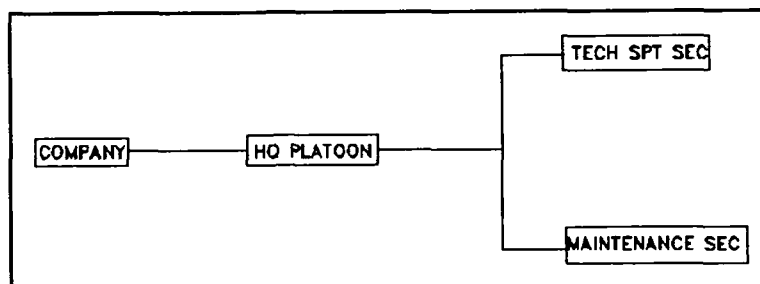
Figure 48. Screen representing the
hierarchical structure of the SORD unit.

<PgDn> causes the summary screen illustrated in Figure 48
to be displayed.

Look at Organizational Structure

The summary screen presents a diagram of the
hierarchical structure of the unit organization. This
diagram reflects the names of all the elements designated
for the unit, with the basic, first level elements shown
on the right-side of the screen, merging into successively
higher level elements, and the highest-level element
showing on the left-side of the screen. The summary
screen illustrated in Figure 48 can also be accessed
directly from the C2M Main Menu by selecting the "Look
at Organization Structure" option and pressing <PgDn>.

Assign C2 or Support Personnel

After viewing the summary diagram of the organization
structure, pressing <PgDn> will cause the screen
illustrated in Figure 49 to be displayed. This screen
can also be accessed directly by selecting the "Assign C2
or Support Personnel" option of the C2M Main Menu.
This screen, labelled "Assign Command and Control
Personnel", will identify the name and level of an
organizational element and prompt the user to identify the
quantities of personnel specialties, each designated by

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their MOS and standard job title, who are to be assigned
to that element to satisfy any requirement for command,
control, or other support. Pressing <PgDn> causes other
similar screens to be displayed, one for each of the
organizational elements at each level of the structured
unit. After any required, but non-mission essential,
personnel have been assigned to the elements of the unit
organizations for command, control, and support functions,
pressing <PgDn> causes a summary screen to appear. The
next press of the <PgDn> key causes the C2M Main Menu to
be displayed.

```
SORD-UDS-CAM-CCP           [        ]

 ┌─────────────────────────────────────┐
 │  Assign Command and Control Personnel│
 └─────────────────────────────────────┘

      ELEMENT: [TECH SPT SEC]    LEVEL: [1]

      QTY          PERSONNEL            JOB TITLE

      ┌───┐        ┌──────────┐        ┌──────────────┐
      │ 1 │        │ 13B      │        │ TECH SPECIALIST│
      │   │        │          │        │              │
      │   │        │          │        │              │
      │   │        │          │        │              │
      │   │        │          │        │              │
      │   │        │          │        │              │
      └───┘        └──────────┘        └──────────────┘
```

Figure 49. Screen allowing command and
control personnel to be assigned to
higher level units.

The Constraints Application Module (CAM)

The final module of the UDS, the Constraints
Application Module (CAM), allows the user to determine if
the unit, as tentatively designed, has exceeded any
manpower or personnel constraints or ceilings that had
previously been imposed. If it is determined that the
constraints have been exceeded, the module helps the user
to identify and eliminate the least critical personnel
from the unit design.

Selecting the "CAM" option of the UDS Main Menu
causes the display of the CAM Main Menu, illustrated in
Figure 50. Except for the two options for returning to
the UDS Main Menu and the SORD Main Menu, respectively,
the only option available in the CAM Main Menu is the

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one labelled, "Identify Personnel to be Eliminated from Unit." Succeeding paragraphs describe the screens presented to the user if this option is selected.

```
┌─────────────────────────────────────────────┐
│ SORD-UDS-CAM-MENU                            │
│ ┌─────────────────────────────────────────┐ │
│ │     Unit Design Subsystem (UDS)         │ │
│ │   Constraints Application Module  (CAM) │ │
│ ├─────────────────────────────────────────┤ │
│ │          CAM Main Menu                  │ │
│ ├─────────────────────────────────────────┤ │
│ │ Identify Personnel to Eliminate from Unit│ │
│ │                                         │ │
│ │ Unit Design Subsystem Menu              │ │
│ │                                         │ │
│ │ SORD Main Menu                          │ │
│ └─────────────────────────────────────────┘ │
└─────────────────────────────────────────────┘
```

Figure 50. CAM Main Menu.

Identify Personnel in Excess of Manpower Constraints

Upon selecting the option, "Identify Personnel to be Eliminated from Unit", the screen illustrated in Figure 51 is displayed. The total number of personnel assigned to the unit is given as a number on the screen in the box labelled "Personnel are Assigned to the Unit". This number represents all mission essential personnel assigned to the unit in the USM and all C2 and support personnel assigned to the unit in the C2M. This count of personnel includes those who are assigned to the unit because they are designated as crew members of an assigned materiel system or as personnel in an assigned cell. The user is prompted to enter a number which reflects how many people need to be eliminated from the unit so that the size of the unit does not exceed predetermined personnel constraints.

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```
SORD-UDS-CAM-SR     ┌──────┐
┌────────────────────────────────────────┐
│          Specify Reductions            │
└────────────────────────────────────────┘


┌────────┐
│   10   │  Personnel are assigned to the Unit.
└────────┘
┌────────┐
│    1   │  Personnel from the unit need to be
└────────┘  removed.


AR 310-31 indicates that reductions should be attempted
just by line reductions such as helpers, assistants
and messengers.  If this results in unacceptable
degredation, reductions should be acheived through the
elimination of small component elements.
```

Figure 51. Screen allowing the user to specify desired personnel reductions.

If the number of personnel assigned to the unit is within predetermined constraints, the user enters "0". Then, upon pressing <PgDn>, the CAM Main Menu is displayed and the user can select the SORD Main Menu option, essentially signalling the completion of the unit design subsystem. If the user determines that too many personnel have been assigned to the unit, the user enters the number which need to be eliminated from the design, and presses <PgDn>. This will cause the next screen, illustrated in Figure 52, to be displayed.

Review Mission Requirements and Unit Structure

The screen, illustrated in Figure 52, invites the user to review all essential features of the unit's mission and its tentative design. Selecting, in turn, each of the four options given in Figure 52 will lead to the following displays:

(1)   Display Structure of the Unit: Selecting this option causes a diagram to be presented showing the hierarchical structure of the unit organization. This is the same diagram as was described in conjunction with the C2M screen illustrated in Figure 48.

(2)   Display Tasks of the Unit: Selecting this option causes the quantitative values assigned to each required task of the unit to be displayed. These are the quantitative values that were entered for each mission essential

task in the Mission Quantification Module of
the Mission to Function Subsystem. Recall
there was the option to quantify up to 10
different attributes for each mission essential
task. If any quantitative values were entered
at that time, a summary of those entries will
be displayed.

```
SORD-UDS-CAM-RA  ┌────┐
┌──────────────────────────────────┐
│        Review Assignments        │
└──────────────────────────────────┘

 DISPLAY STRUCTURE OF THE UNIT

 DISPLAY TASKS OF THE UNIT

 DISPLAY FUNCTIONS OF THE UNIT

 CONTINUE TO IDENTIFY PERSONNEL
```

Figure 52. CAM options menu.

(3)   Display Functions of the Unit: Selecting this
option causes a list of the functions that
must be performed by the unit to be displayed.
This is the same function list that is
discussed in conjunction with the "Display
Functions/descriptors Selected" option of the
FDM Main Menu (see Figure 21).

(4)   Continue to Identify Personnel: This option
is selected to proceed with procedures necessary
to eliminate excessive personnel from the unit
design.

Select Personnel to Eliminate

After reviewing the essential features of the unit's
mission and its tentative design, the user should select
the last option shown in Figure 52. Doing so causes a
listing of all personnel tentatively assigned to the unit
to be displayed. The format of this display is
illustrated in Figure 53.

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SELECT CANDIDATES AND ELIMINATE PERSONNEL

Type a number and a letter "E" next to those you wish to
Eliminate. Type a number and a letter "C" next to those
You wish to consider further for elimination.

Would you like to use a Note Screen? (Y/N)   [N]

QTY	'E' 'C'	IN UNIT	PERSONNEL	JOB TITLE	FUNCTION
1 1	C E	1 1	13 B 63B 40 9 15 AO	Platoon Sgt. Motor Sargeant Unit Maint. Tech	C2 PERSONNEL To Provide Maint Serv To Provide Maint Serv

Figure 53. Screen allowing the user to
eliminate tasks and select tasks to be
further considered for elimination.

As can be seen in Figure 53, each line of data in
the listing of personnel gives the following information:

(1) the number of personnel currently assigned to
     the unit (in the column labelled "In Unit"),

(2) the specified personnel specialty of these
     personnel (in the columns labelled "Personnel"
     and "Job Title"), and

(3) the function performed by this personnel
     specialty (in the column labelled "Function").
     Note that the functions listed include (a)
     those that must be performed by the Level 1
     basic elements of the unit if the unit is to
     accomplish its mission and (b) those that are
     to be performed by the C2 and support
     personnel assigned to all levels in the
     organizational structure of the unit.

The user is to enter the following two values: (a)
a number in the column labelled "QTY" to represent the
number of personnel from a selected personnel specialty
that are to be considered for removal from the unit, and
(b) either a "E" or a "C" in the column labelled "E/C"
to indicate whether that number of personnel are to be

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eliminated or are merely to be considered for elimination, respectively. Entering only "E" for the all of the quantities of personnel selected causes the screen illustrated in Figure 55 to be displayed. The screen displayed in Figure 55 will be described shortly.

IMPORTANT: **The number in the "QTY" column of the screen illustrated in Figure 53 must not exceed the number in the "IN UNIT" column. Otherwise, an error message will appear when the <PgDn> key is pressed.**

The option to merely designate candidates to be considered for elimination from the unit is particularly desirable when there are many different types of personnel and many heterogeneous mission tasks and functions. If the user specifies "C" for any of the personnel specialties and then presses <PgDn>, the screen illustrated in Figure 54 will be displayed.

Figure 54. Personnel to be further considered for elimination.

The screen illustrated in Figure 54 lists the personnel specialties that were selected with a "C" for further consideration. The screen also indicates (a) the "Number of Personnel [which still need] to be Eliminated" and (b) the total number, if any, already directly eliminated by using "E" in the previous screen. To eliminate personnel using the screen illustrated in Figure 54, the following actions are taken:

(1)   Press <Return> or <Shift>-<Tab> to move the
       cursor to the space in front of the personnel
       to be eliminated.

(2)   Press any key to put an asterisk in that
       space.

(3)   Continue with Steps (1) and (2) until the
       necessary number of personnel are marked for
       elimination. Then, pressing <PgDn> causes the
       screen illustrated in Figure 55 to be
       displayed.

```
SORD-UDS-CAM-SP      ┌─────┐
┌──────────────────────────────────────────────┐
│ Summary of Personnel to be Eliminated │
└──────────────────────────────────────────────┘

YOU SHOULD PRINT THIS LIST OF PERSONEL AND THEN GO TO
THE USM MODULE AND ELIMINATE THESE PERSONEL FROM THE
SPECIFIED FUNCTIONS.

QTY   PERSONNEL   JOB TITLE         FUNCTION

 1    138         Platoon Sgt.      C2 Personnel
 1    638 40      Motor Sgt         To Provide Maint Serv
```

Figure 55.   Elimination summary
screen.

IMPORTANT: The number of personnel to be eliminated or
considered for elimination must be equal to or greater
than the value specified in the reduction specification
menu (see Figure 51).   Otherwise an error message will
appear.

IMPORTANT: The screens illustrated in Figures 53 and 54
both require the user to indicate by entering "Y" or "N"
whether or not a message has been entered into a note
screen to justify or otherwise comment on the decisions
made in eliminating personnel from the unit, as initially
designed.   The user is encouraged to use these note
screens to document the rationale for these decisions.

The summary screen (see Figure 55) lists the
specific personnel that have been targeted for elimination
from the initial unit design.   As per the instructions
given on this screen, the user is to go to the USM and
edit the entries previously made in order to eliminate
the specified numbers of each targeted personnel
specialty.

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NOTE: If the personnel to be eliminated are in the unit because they were designated as crew members of an assigned materiel system or as personnel in an assigned cell, the user will have to go to the Crew/Cell Data Base and modify the crew or cell that contained these personnel.

After this step has been accomplished, the user has completed the design of the unit. Pressing <F5> will cause the SORD Main Menu to be displayed. The user is now ready to select the Design Evaluation Subsystem of SORD to evaluate the design just completed and, if appropriate, print the Unit Reference Sheet. In any case, the user should press <F3> and save the work that has been finished.

The third and, in normal order of use, final subsystem of SORD, the Design Evaluation Subsystem (DES) will aid the user in assessing and verifying that the capabilities of the unit that was designed in the UDS will match the mission requirements that were determined in the MFS. The DES will also maintain a file of all unit designs (including alternative designs for a specific set of mission requirements) and provide a format for report generation.

The DES is available from the SORD Main Menu. Selecting the "Design Evaluation Subsystem" option from the SORD Main Menu will cause the DES Main Menu, illustrated in Figure 56, to be displayed. As may be seen, the DES Main Menu has three options: one for aiding the process of design evaluation, one for accessing the report generation module, and one for returning to the SORD Main Menu. The first option is, for all practical purposes, the DES; subsequent references to the DES should be considered equivalent to those that could be made to the "Evaluate Design" option of the DES Main Menu. The "Report Module" option accesses a stand-alone component of SORD. This section of the SORD User's Manual will address each of the these two options.

```
┌─────────────────────────────────────────────────┐
│ SORD-DES-MENU                                     │
│  ┌─────────────────────────────────────────────┐ │
│  │                                             │ │
│  │ │Design Evaluation Subsystem (DES)          │ │
│  │ └───────────────────────────────────────    │ │
│  ├─────────────────────────────────────────────┤ │
│  │   DES Main Menu                             │ │
│  ├─────────────────────────────────────────────┤ │
│  │   Evaluate Design                           │ │
│  │   Report Module                             │ │
│  │   Return to SORD Main Menu                  │ │
│  └─────────────────────────────────────────────┘ │
└─────────────────────────────────────────────────┘
```
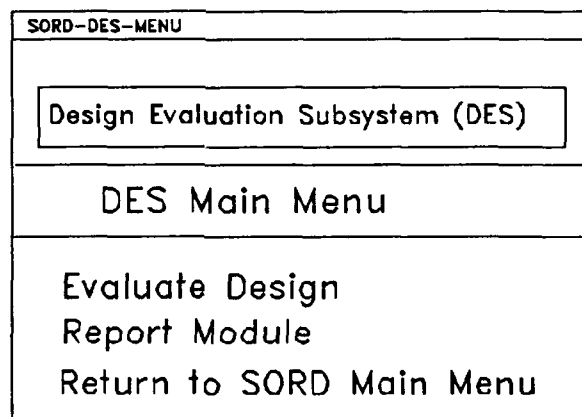
Figure 56. DES Main Menu.

The Evaluate Design Option

Upon selecting the "Evaluate Design" option of the DES Main Menu, the screen illustrated in Figure 57 will be displayed. As shown in Figure 57, this screen presents a list of the mission essential tasks that were identified in the first stages of the mission to function subsystem (MFS).

```
SORD-DES-IO          [        ]
┌─────────────────────────────────────┐
│       Identify Task to Verify        │
└─────────────────────────────────────┘

[*] 1.  RECEIVE, STORE, WAREHOUSE, AND ISSUE AMMO.
[ ] 2.  DETERMINE UNIT AMMO NEEDS.
[ ] 3.
[ ] 4.
[ ] 5.
[ ] 6.
[ ] 7.
[ ] 8.
[ ] 9.
```

Figure 57. Unit task list.

The user is prompted to select a task that will serve as a basis for verifying the adequacy of the unit's designed capabilitic⁻ ᵀo select a task, the user takes the following actioɪ⌐:

(1)   Press <Return> or <Shift>-<Tab> until the cursor is in the box to the left of the task to be selected.

(2)   Press any key. An asterisk will appear indicating that the task has been selected.

(3)   Press <PgDn> to display the screen illustrated in Figure 58.

This screen presents a number of different types of information to the user. In addition to showing the name of the selected mission essential <u>task</u>, the screen identifies a <u>function</u>, selected previously in the MFS that must be performed by the unit if it is to accomplish the

Figure 58. Screen allowing comparison of unit requirements and unit capabilities.

selected task. In a field at the bottom left-side of the screen, labelled "REQUIREMENTS", is listed the quantitative and qualitative specifications for that function, as determined by the user in the function determination module of the MFS. In the field at the bottom right-side of the screen, labelled "CAPABILITIES", is listed the materiel and personnel assets assigned to the unit in the unit sizing module of the UDS to meet the functional requirements.

The user is prompted to review and evaluate all the information given on this screen and, based on the outcome of that process, indicate if the capabilities of the designed unit are necessary and sufficient to successfully perform the identified function of the selected mission essential task. Two principal outcomes of this decision are possible:

(1)   If the user decides that the capabilities
        of the unit match the functional requirements
        of the task, no action is required. The user
        can proceed to evaluate the adequacy of unit
        design for the next function specified for the
        selected task or, if no further functions were
        specified for that task, for the next task.
        The user does this by pressing <PgDn>, causing
        the information presented in the screen to be
        changed accordingly.

(2)   If the user decides that the capabilities of
        the unit do not match the functional
        requirements of the task, the user must make
        at least two entries.

(a) The user must indicate whether the mismatch is due to the unit having more capacity than necessary to meet the functional requirements or to the unit having insufficient capacity to meet those requirements. In the case of too much or an overage in capacity, the user presses the <+> key. If the unit has too few or a shortage of capacity, the user presses the <-> key.

(b) Given that there is no match between the unit as designed and the functional requirements of the selected mission essential task, the user must indicate whether the mismatch condition is unacceptable, by entering "U", or acceptable, by entering "A".

NOTE: If unacceptable, the user will most likely wish to either redesign the unit or redefine the mission of the unit. If the mismatch between unit capabilities and mission requirements is acceptable, the user may not wish to make any immediate changes to either the design of the unit or the definition of the requirements. In this case, the user may merely wish to take notice of and record the possible causes and consequences of the mismatch, and flag this unit design for future consideration and action.

NOTE: If an indication of an overage or shortage condition is entered, an indication of unacceptable or acceptable action must also be entered, and vice versa.

The user may record a message in a note file to document the rationale for any decisions made as a result of reviewing the information presented on a screen like that illustrated in Figure 58. To call up a note screen the user presses <Return> or <Shift>-<Tab> to move the cursor next to the box with the "NOTE" label. Pressing any key will put an asterisk in the box. Then pressing <PgDn> will cause a note screen to be presented. The user is encouraged to use these note screens to establish an audit trail. Any message entered into a note screen associated with a design evaluation screen is treated by SORD as an expression of a limitation of the design.

IMPORTANT: The URS report that is generated by SORD **will** list the contents of these DES note screens as limitations of the unit as designed. These messages are the **only** means to record limitations of the unit design in the URS.

When the user has reviewed and evaluated the unit as designed for all the functional requirements of each mission essential task, pressing <PgDn> causes the display of a summary screen, illustrated in Figure 59. This summary screen lists the frequency of occurrence of each possible outcome of the design evaluation. The evaluation leads to the decision that there is no condition of mismatch between unit capabilities and mission requirements, or that there is a difference and, in which case, that difference is acceptable or unacceptable. Since the capability of the designed unit is separately evaluated for each set of function specifications for each mission essential task, the sum of the frequencies shown in the slide illustrated in Figure 59 must equal the total number of functions evaluated or the total number of separate evaluation screens presented for consideration by the user.

```
┌─────────────────────────────────────────────────┐
│ SORD-DES-AS    ┌────────┐                        │
│               ┌┴────────┴──────────────────────┐ │
│               │        Action Summary          │ │
│               └────────────────────────────────┘ │
│                                                   │
│                                                   │
│     UNACCEPTABLE DIFFERENCES:  N = │ 2 │          │
│                                                   │
│       ACCEPTABLE DIFFERENCES:  N = │ 0 │          │
│                                                   │
│  CAPABILITITES = REQUIREMENTS:  N = │ 0 │         │
│                                                   │
│                                                   │
└─────────────────────────────────────────────────┘
```

Figure 59. DES summary screen.

After reviewing the information presented in the DES summary screen, the user has completed a design of a particular unit. The user should save the results of this effort by pressing <F3>. Having done so, the user may wish to generate a Unit Reference Sheet report or return to the UDS or MFS to begin to create another design. In either case, pressing <PgDn> will cause the DES Main Menu to be displayed. From the DES Main Menu the user may select options to proceed with either alternative. The next section will describe the Report Module option.

The Report Module

At present, SORD has the capability to generate a single, standard formatted URS report only. Upon selecting the "Report Module" option of the DES Main Menu, a screen titled, "Report Preparation," will be displayed. This screen prompts the user to enter information into eight differently labelled fields. The labels and the information entered are reproduced onto the title page of the URS Report. All other information used for the URS Report has already been entered into SORD.

The last line shown on the report preparation screen requires the user to select the medium for the report. The user must enter "S" for screen output, or "P" for printer output. If screen output is designated, pressing <PgDn> causes the report to be displayed on the screen. If printer output is designated, pressing <PgDn> causes the following warning to be displayed: "The Printing of a SORD Report Requires GRAPHICS.COM to be Loaded and a Compatible Printer." The user must then enter a "Y" or a "N" in response to the probe, "Print Report." Pressing "Y" and <PgDn> then causes a hard copy of the report to be printed. Regardless of the medium selected, after the report is generated the user is prompted to press any key to continue. Pressing any key causes the DES Main Menu to be displayed.

PART SIX -- THE CREW DATA BASE

The Crew Data Base (CDB) is a component of SORD that can be used to develop two different types of assets groupings: (a) personnel crews that operate, maintain, or otherwise service a specific materiel system, and (b) cells of personnel and materiel assets that perform selected functions but are not specifically associated with any particular materiel system. The idea behind this data base is that there are specific clusters of assets that will be used repeatedly in designing different elements within a given unit and across different units. The CDB assists the user in entering the information necessary to develop such a cluster of assets and then to store that information. Once stored in the data base, the assets that define a crew or cell can be called up and used at several points in the UDS.

SORD treats a crew and a cell differently. A _crew_ is defined by SORD as a group of personnel that are employed in conjunction with a particular materiel system (e.g., a M109 155-mm self-propelled howitzer). If that materiel system is identified as a candidate system for meeting mission requirements in the Materiel System Identification Module (MSIM) and subsequently assigned to the unit in the Unit Sizing Module (USM), the user can designate that a crew exists for that system. If the user does so, SORD will automatically call up and include the predesignated crew of the system into the personnel assets file for the unit. In these cases, the name given to the crew in the CDB _must be identical_ to the name given to the materiel system in the MSIM and USM.

On the other hand, a _cell_ is defined by SORD as a cluster of personnel and equipment that performs a required function for the unit but that is not linked to a particular materiel system (e.g., an S1 section of a headquarters and headquarters company, or the mess section attached to a maneuver company). When operating within the Unit Sizing Module of the UDS, SORD will prompt the user to assign cells to the unit to satisfy functional requirements of mission essential tasks. These cells are each subsequently assigned as basic elements to the lowest level in the unit structural hierarchy.

The CDB is accessed by selecting the option with that name from the SORD Main Menu. Selecting that option causes a CDB Main Menu, illustrated in Figure 60, to be displayed. The CDB Main Menu shows seven options.
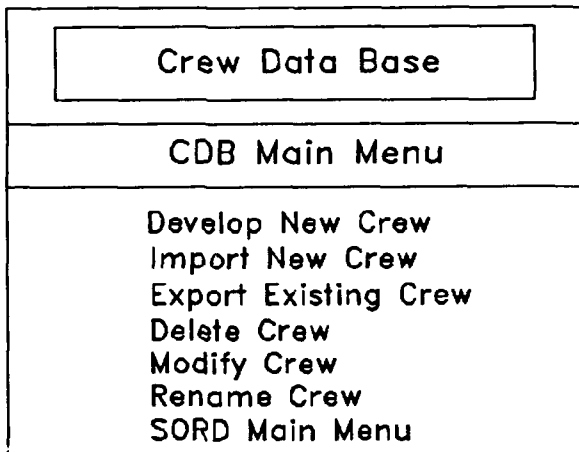
```
┌─────────────────────────────────────────────┐
│  ┌───────────────────────────────────────┐  │
│  │         Crew Data Base                 │  │
│  └───────────────────────────────────────┘  │
├─────────────────────────────────────────────┤
│            CDB Main Menu                      │
├─────────────────────────────────────────────┤
│            Develop New Crew                   │
│            Import New Crew                     │
│            Export Existing Crew                │
│            Delete Crew                         │
│            Modify Crew                         │
│            Rename Crew                         │
│            SORD Main Menu                      │
└─────────────────────────────────────────────┘
```

Figure 60.   CDB Main Menu.

The first option, "Develop New Crew", aids the user in developing a crew or cell. The next two options shown, "Import New Crew" and "Export Existing Crew," are not operational in this version of SORD and can be ignored. (Selecting them merely returns the user to the CDB Main Menu.) The next three options permit the user to delete, edit, or rename crew (or cell) files previously created. Selecting the last listed option returns the user to the SORD Main Menu.

To develop a new crew (or cell), select the option with that label from the CDB Main Menu and the screen illustrated in Figure 61 will be displayed. This screen prompts the user to provide a name for the crew or cell. Providing a name and pressing <PgDn> will display the screen illustrated in Figure 62. That screen prompts the user to assign personnel to that crew or cell. To do so, the user specifies the MOS and standard job titles of the personnel specialties, and designates the quantity of each specialty to be assigned to the crew or cell. At the bottom of the screen the user is asked to enter either "Y" or "N" to indicate if the entity being developed is or is not a cell. If the user enters "N", pressing <PgDn> causes the CDB Main Menu to be redisplayed. At this point the user will have named and developed a crew.

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Figure 61. Box prompting crew [or cell] name.

Figure 62. Screen output prompting personnel information for the Crew/Cell Data Base.

If, after assigning personnel specialties to the entity being developed, the user enters "Y" into the box at the bottom of the screen to indicate that a cell is being developed, pressing <PgDn> causes the screen illustrated in Figure 63 to be displayed. This screen

Figure 63. Screen prompting materiel systems information for the Crew/Cell Data Base.

prompts the user to assign materiel systems to the entity being developed. Then pressing <PgDn> causes the CDB Main Menu to be displayed. At this point, the user has named and developed a cell.

If the user selects the "Delete Crew", "Modify Crew", or "Rename Crew" options of the CDB, a screen will be presented which lists the crews and cells previously named and developed. In the case of the Delete option, selecting a crew or cell name and pressing <PgDn> will cause the file for that crew or cell to be deleted from the data base. In the case of the Modify option, selecting a crew or cell name and pressing <PgDn> will cause the screen for assigning personnel specialties to be displayed and, if the named entity is a cell, pressing <PgDn> a second time causes the screen for assigning materiel systems to be displayed. The user may modify the information in either screen and then press <PgDn> to display the CDB Main Menu. If the option to rename a crew or cell is selected, the "CREW DATA" screen illustrated in Figure 62 is presented with an overlaying prompt to enter the name for the new crew. The user may enter the new name and press <PgDn> to display the CDB Main Menu. Note that if the user wishes to design a unit that incorporates a crew or cell that differs only slightly from one that already exists in the CDB, the user should first rename the existing crew or cell and then modify the newly named entity.

PART SEVEN -- CONCLUSION

The Army Need for an Organizational Design Methodology

The previously published primer for SORD argued that there was an Army need to standardize the force design process and to make that process work more effectively, efficiently, and reliably. Several factors combine to create this need. The rapid pace of changes in mission requirements, high technology, equipment and personnel assets, and the defense budget have produced a high workload for force designers. To make matters worse, there is good reason to believe that the numbers of unit design programs will grow rather than shrink, and that the number of authorized designers will shrink rather than grow. Furthermore, the organization documentation process is scheduled to be centralized across the Army. This change in Army management require that branch-specific intelligence be more adequately summarized and incorporated into the Unit Reference Sheet (URS).

The SORD Process

The SORD methodology has been developed to meet this Army need. SORD is a user-oriented, computer-assisted tool that creates a standardized process and structure in which the initial organizational design concepts for an Army unit can be created and documented. The SORD methodology literally forces the combat developer to address three basic components of the unit design process: (a) insuring that the unit design process is driven by the unit's mission; (b) designing a structured unit with all its required materiel and personnel assets; and (c) verifying that the designed unit does have the capabilities required to accomplish its mission.

Translating Mission Requirements to Function Specifications

Insuring that the design of an organizational unit is responsive to the unit's mission is a weak link in the present unit design process. A complete mission analysis often does not precede the design of a unit, and even when a mission analysis is done, it is often not as thorough and certainly not as quantitative as it should be.

However, just as with the design of a materiel system, Army and Department of Defense requirements and

guidelines mandate that the design of an organizational unit be driven by mission requirements. Mission requirements are, in turn, determined through a careful analysis of such critical issues as the mission objectives, the nature and capabilities of the threat, and the area and concept of operations. A complete mission analysis specifies, down to the function level, the precise requirements that must be fulfilled by the organizational unit. SORD assists the dedicated unit designer to perform a complete mission analysis and to translate global mission requirements into detailed function specifications.

Designing a Structured Unit with Required Capabilities

The requirements of a mission are used to determine necessary unit capabilities. These unit capabilities, in turn, drive the determination and organization of materiel and personnel resources assigned to the unit. Constraints imposed by available materiel, personnel, and funding, while critical during the subsequent processes of developing force structure and documenting unit authorizations, are not permitted to impede the creative process of objectively deriving unit design concepts for "future" battles. Indeed, the design process may specify a requirement for resources, operational characteristics, and doctrine that do not currently exist.

The current process of designing an organizational unit is often derived directly from the experiences and traditions of the combat developers who participate in the process. Too often, these experiences and traditions may not be relevant to the "future" requirements and capabilities of Army units and hence they can impede the search for innovative solutions to unit design issues and concerns. SORD encourages the dedicated user to consider more of the viable options for assigning and organizing materiel and personnel assets.

Verifying the Match Between Unit Capabilities and Mission Requirements

A final, formal procedure to verify that the capabilities of a designed unit match its mission requirement is generally absent in the unit design process. Rather, a unit design based on the designers knowledge and experience is generally presumed to be at least adequate. However, the determination of mission requirements, if done formally at all, is a top-down process that begins with general mission statements and ends with detailed function specifications. On the

other hand, the unit design process is a bottom-up process, in which the capabilities of lower echelon elements are established prior to filling out the total unit structure. Furthermore, different individuals and different elements within the combat development process may determine the requirements of a mission and the capabilities of designed units. SORD provides a formal mechanism that enables a combat developer to compare the capabilities of the designed unit and the requirements for each function within each task of the unit mission.

Benefits of the SORD Methodology

In the process of assisting the unit designer in preparing a standardized unit reference sheet (URS), SORD provides certain benefits that may not be immediately apparent. Several of these benefits are summarized in succeeding paragraphs.

SORD Permits the Rapid Development of Alternative Unit Design Concepts

After designing and saving the file of a baseline or reference unit, the user can copy and rename that baseline unit file to form an identical unit file. The mission requirements, personnel and materiel assets, and organizational structure contained in that unit file can be modified to create numerous 'what-if' alternatives. Combining this save-and-modify feature of SORD unit files with the capability provided by the Crew/Cell Data Base enables the user to quickly examine the impact of variations in overall unit missions and capabilities as well as the impact of variations in the composition of specific clusters of unit assets.

SORD Ensures Uniformity in the Process and Structure of Unit Design Concepts

The SORD software assures a high degree of uniformity in the unit design process, producing a URS that is an acceptable reference for organization documenters who will be removed not only geographically but also experientially from the unit designer who created the URS. SORD thus permits the centralization of TOE documentation and management within the Army. While such a realignment will result in substantial personnel and monetary savings, it also demands the URS be completed in a manner that permits the unit designers to exert early, front-end control over the TOE documentation process. The unit designer must be able to insert the design intelligence of their branch or functional area into the URS because a different agency will do the documentation.

SORD Increases the Thoroughness of the URS

Because of the thoroughness of the designs it helps to create, SORD will, in most instances, eliminate the need to develop an Automated Unit Reference Sheet in the process of developing a draft TOE. The user input required to create more complete unit designs should also facilitate meaningful interactions among combat developers and other personnel at the branch schools or in the functional areas. Since the SORD software and unit files are transportable, different components of the SORD process may be completed by several geographically dispersed individuals.

SORD Enhances the Force Design Proponent's Control over the URS Development Process

The mandated use of SORD will ensure that a standardized process drives and controls the development of a URS. Once the process is in the hands of the integrating study agency at the Combined Arms Command, the study manager or the proponent for combined arms operations will be in a position to be proactive rather than reactive in the guidance given to subordinate schools and centers.

SORD Facilitates the Creation of a Useful Audit Trail

Currently, there is no procedure or requirement for maintaining an audit trail during the design and documentation of organizational concepts. Consequently, independently convened URS development teams could each create perfectly valid designs that differ in substantial ways from each other, without anyone being able to determine what differences there may have been in the design rationale that caused the designs to be different. SORD causes the user to record a complete audit trail so that others will be able to reconstruct each step of the unit design process.

Feedback from Users of the SORD Methodology

The guidance and assistance provided by SORD can and should be carefully examined in its future applications. As more and more unit designers use SORD to develop organizational concepts, there will be an ever increasing pool of perceived shortcomings and suggestions for improving the methodology. It is to be expected that there will be future versions of SORD designed to refine and enhance the methodology.

The most important source of information to direct refinements to the SORD methodology is feedback from its users. To facilitate this feedback, two different rating forms have been developed and are contained in the appendices of this User's Manual. An evaluation form for this User's Manual is at Appendix A and a survey form to address principally the user-software interface of the SORD methodology is at Appendix B. SORD users are encouraged to complete copies of these feedback instruments after they acquire experience with this manual and the software. The completed survey forms should be returned as indicated.

As resources necessary to enhance the SORD methodology are made available, the user's feedback will be incorporated into future versions of the SORD software and the user's manual. Likewise, the user input will aid in the development of other tools that might be developed to aid the force developer and enhance the force development process.

REFERENCES

Christ, R. E., Conroy, J. A., & Briggs, A. L. (1990). Systematic Organizational Design (SORD) Methodology: A Primer. (ARI Research Product 90-27, DTIC Assession Number AD A230 103) Alexandria, VA: U.S. Army Research Institute for the Behavioral and Social Sciences.

U.S. Army Training and Doctrine Command. (February, 1990). Draft TRADOC Regulation 71-17: Unit Reference Sheets and Automated Unit Reference Sheets. Fort Monroe, VA.

APPENDIX A

Evaluation Form for the
Systematic Organizational Design (SORD) Methodology
User's Manual

EVALUATION FORM
FOR THE
SYSTEMATIC ORGANIZATIONAL DESIGN (SORD) METHODOLOGY
USER'S MANUAL

Thank you for taking the time to fill out this evaluation form for the User's Manual for the SORD Methodology. We feel that you, as a user of the SORD methodology, are the best source to evaluate the manual. Your suggestions and comments will be carefully considered. You can have a significant impact on the next edition of the SORD User's Manual.

The more specific and detailed your responses to items in this evaluation form, the easier it will be for us to discern the nature of any problem you identify and incorporate your suggestions into the next edition. If there is not enough space for your comments, please feel free to continue writing your comments on additional sheets of paper. Of course, we will protect your confidentially and not identify you personally with any comment you make concerning the strengths and weaknesses of the objectives or the procedures incorporated into SORD.

We would like to contact you if we have questions about any of your responses. Please provide us with the following information (**Please** Print):

Your Name _____

Address _____

_____

_____

Phone   Autovon _____ - _____

Commercial (___) _____ - _____

Please return the completed survey to:

Dr. Richard E. Christ, SORD POC
US Army Research Institute Field Unit
P.O. Box 6057
Fort Bliss, TX 77906-0057
Phone: AV 978-5297/4491
        (915) 568-5297/4491

A-3

EVALUATION FORM
FOR THE
SYSTEMATIC ORGANIZATIONAL DESIGN (SORD) METHODOLOGY
USER'S MANUAL

Please rate the extent to which each part of this User's Manual meets its specified criteria. Put a vertical line or some other marking on the rating scale given for each part of the manual to indicate your evaluation for each separate criterion (lettering each rating on the rating scale to indicate the specific criterion being evaluated) or, if you prefer, use each rating scale once to indicate your overall evaluation of each part of the manual. Written comments are encouraged; they will clarify your ratings and provide suggestions on how to improve the manual.

PART ONE -- INTRODUCTION:

    (a) Are the contents of this part of the manual clearly presented?
    (b) Is the overview of the SORD methodology adequate to define the purpose and scope of SORD?
    (c) Is the description of SORD user requirements useful?

```
|               |                |               |
|_____|_____|_____|
Barely          Moderately        Substantially
```

PART TWO -- INSTALLING AND UNDERSTANDING SORD:

    (a) Are the contents of this section clearly presented?
    (b) Is the general description of conventions used in the manual and of the hardware and software requirements useful?
    (c) Are the instructions presented for generally operating SORD, managing unit files, and moving around in SORD adequate enough to enable a typical user to install and operate SORD?
    (d) Are the descriptions and examples of required user input sufficient to guide the user?
    (e) Is there an adequate use of figures to represent screen outputs and user inputs?

```
|               |                |               |
|_____|_____|_____|
Barely          Moderately        Substantially
```

A-4

PARTS THREE THROUGH SIX

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****************************************************************
```
Your assessment of the value of Parts Three through Six of the SORD User's
Manual is also addressed by your responses to the User Survey for the SORD
Methodology. A copy of that survey is at Appendix B of this User's Manual.
Your completion of that survey, in its entirety, would be of immense value
during the preparation of the next version of the SORD software.
```
****************************************************************
```

     (a) Are the contents of these parts clearly presented?

     (b) Is all the information and instructions presented <u>necessary</u> for you
to use SORD to design and document a unit design using your computer?

     (c) Are the information and instructions presented <u>sufficient</u> for you
to use SORD to design and document a unit design using your computer?

     (d) Are there adequate descriptions and examples of required user input
to guide the user through a successful application of SORD?

     (e) Is there an adequate use of figures to represent screen outputs and
user inputs?

     (f) Are the cautionary NOTES, WARNINGS, and other explanatory materials
in the manual meaningful and useful?

```
   |_____|_____|
 Barely          Moderately       Substantially
```

PART SEVEN -- CONCLUSION

     (a) Are the contents of this part clearly presented?

     (b) Is the information presented useful in summarizing the purpose and
benefits of the SORD methodology?

     (c) Is the information presented <u>necessary</u> to summarize the purpose and
benefits of the SORD methodology?

     (d) Is the information presented <u>sufficient</u> to summarize the purpose
and benefits of the SORD methodology?

```
   |_____|_____ _____|
 Barely          Moderately       Substantially
```

APPENDIX B

User Survey Form for the
Systematic Organizational Design (SORD) Methodology

USER SURVEY FORM
FOR THE
SYSTEMATIC ORGANIZATIONAL DESIGN (SORD) METHODOLOGY

Thank you for taking the time to fill out the attached survey form. The present version of the SORD software has been distribute across the Army and is the TRADOC mandated methodology for developing and documenting organization Unit Reference Sheets (URS). We feel that you, as a user of the SORD methodology, are the best source to evaluate the software. Your suggestions and comments will be carefully considered. You can have a significant impact on future versions of SORD.

The more specific and detailed your responses to items in the survey, the easier it will be for us to discern the nature of any problem you identify and incorporate your suggestions into the next version of SORD. If there is not enough space for your comments, please feel free to continue writing your comments on additional sheets of paper. Of course, we will protect your confidentially and not identify you personally with any comment you make concerning the strengths and weaknesses of the objectives or the procedures incorporated into SORD.

We would like to contact you if we have questions about any of your responses. Please provide us with the following information (**Please** Print):

Your Name _____

Address _____

_____

_____

Phone   Autovon _____ - _____

Commercial (____) _____ - _____

Please return the completed survey to:

Dr. Richard E. Christ, SORD POC
US Army Research Institute Field Unit
P.O. Box 6057
Fort Bliss, TX 77906-0057
Phone: AV 978-5297/4491
        (915) 568-5297/4491

APPLICATIONS

Briefly describe the applications for which you used SORD. If possible, please send copies of unit data sets or files that you generated while using SORD. You should send 5-1/4 inch diskettes containing these data sets to the address given on the cover sheet of this survey.

GUIDANCE FOR USING SORD

A. SORD User's Manual

1. Did you use the SORD User's Manual for guidance when first installing and using SORD? (Circle one of the following)   Yes   No

2. If Yes, was the manual useful for helping you to install and use SORD? (Circle one of the following)   Yes   No

[3. Please use the separate evaluation form provided to give your evaluation of the SORD User's Manual.]

B. Introductory Screens

1. Did you ever use the Introduction Screens for help while using SORD? (Circle one of the following)   Yes   No

2. If Yes, were the Introductory Screens useful as a quick reference to principal Sord-user interface features? Circle: Yes   or   No

3. Please use the space provided below to identify and describe additional introductory or "quick reference" screens that should be incorporated into the SORD program.

C. Help Screens

     1. Did you use the Help Screens available with the <F1> key?
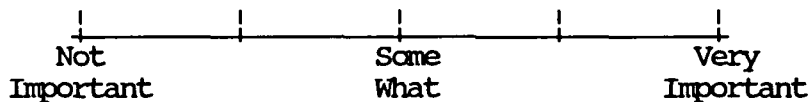Circle: Yes or No

     2. If Yes, were the Help Screens sufficiently informative to be
helpful? Circle: Yes or No

     3. Given your experiences using the Help Screens, please use the space
provided below to (a) identify specific shortcomings in the Help Screens
already in SORD, (b) identify additional help screens that should be
incorporated into SORD, and (c) describe how help screens should be modified
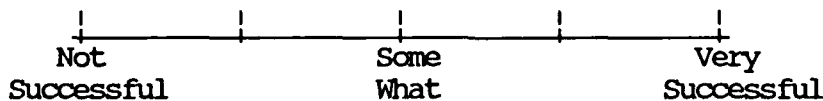to make them more truly useful.

D. Guidance For Using SORD

     1. [If you had an expert from the SORD proponency office come to your
location to assist in the initial installation and use of SORD, please respond
to this question. Otherwise, go to the next item in the survey.]

In your opinion, how important was it to have an experienced SORD user
physically present when you first loaded and used SORD? Put a vertical line
through the scale below to indicate the degree of importance.

```
   |          |          |          |          |
   +----------+----------+----------+----------+
   Not             Some              Very
Important         What             Important
```

     2. In your opinion, how successful were you or would you have been in
installing and initially using the SORD program with only the guidance
provided by the User's Manual and by the introductory and help screens built
into the program? Put a vertical line through the scale below to indicate how
successful you were or would have been installing and using SORD without
outside help.

```
   |          |          |          |          |
   +----------+----------+----------+----------+
   Not             Some              Very
Successful        What             Successful
```

     3. Based on your experience, would the guidance available in the SORD
User's Manual, in the SORD Introductory and Help screens, and from ADP and ISC
personnel available to you at your installation have been sufficient to help
you get the SORD program loaded and operational? Circle: Yes or No

A. Installation and Start-up

1. Did you encounter any problem installing SORD and in getting the program to run?   Circle: Yes or No

2. If Yes, please explain the nature of the problem, and solutions you would like built into the SORD program to solve the problem.

B. SORD's DOS Shell

1. Did you have any problem using the <F7> key to move back and forth between SORD and its DOS shell? Circle: Yes or No

2. Did you have any problem using DOS operations to view, copy, or delete unit files? Circle: Yes or No

3. If your answer to either of the above is Yes, please use the space below to explain the nature of the problem and solutions that should be incorporated into the SORD program.

C. Knowing Where You Are In SORD

1. Did you have any problem knowing where you were in the SORD program during the process of using it? Circle: Yes or No

2. Did you use the path information provided at the top-left corner of the screen? Circle: Yes or No

3. Was this path information useful? Circle: Yes or No

4. Did you use the <F5> key to access the SORD Map? Circle: Yes or No

5. Was the information in the SORD Map useful? Circle: Yes or No

6. Please use the space below to elaborate any of your answers above.

D. Moving Around in SORD

1. Did you have any problem moving between the major components of SORD (e.g., the subsystems)? Circle: Yes or No

2. Did you have any problem moving between modules within or between SORD subsystems? Circle: Yes or No

3. Did you use the "JUMP" operation programmed into the <F5> Map screen to move between modules? Circle: Yes or No

4. Did you have any problem using the "JUMP" operation to move back and forth between modules? Circle: Yes or No

5. Did you have any problem moving from screen to screen within a SORD module? Circle: Yes or No

6. Did you have any problem moving from field to field within a SORD screen? Circle: Yes   No

7. Please use the space below to elaborate any of your answers above.

E. Editing Input Information and Data

1. Did you have any problem editing input for a given screen?
Circle: Yes or No

2. Did you have any problem going back to an earlier screen to edit input that had been previously entered? Circle: Yes or No

3. Please use the space below to elaborate any of your answers above.

F. Printing Screens

1. Did you use the <F2> key to print a SORD screen? Circle: Yes   No

2. Did you have any problem printing a SORD screen? Circle: Yes   No
3. Use the space below to explain the nature of the problem and your solution.

G. Calculator

    1. Did you use the <F10> key to access the calculator?
Circle: Yes or No

    2. If Yes, was this feature of SORD useful during the operation of
SORD? Circle: Yes or No

H. Function Keys

    1. Did you use the <ESCAPE> key to access the function key menu?
Circle: Yes or No

    2. Did you encounter any problem using the function keys that has not
already been addressed in B. through G. above? Circle: Yes or No

    3. If you had problems using any function key that have not already
been addressed above, please use the space below to explain the nature of the
problem. Also, use the space below to identify and describe any possible
solutions to the problem, and any additional, frequently used SORD operations
that should be programmed into the function keys.

I. Mouse

    1. Did you ever use a mouse while operating SORD? Circle: Yes or No

    2. If Yes, was the mouse feature useful during the operation of SORD?
Circle: Yes No

USING THE MISSION TO FUNCTION SUBSYSTEM

A. <u>Mission Conditioning Module</u>

   1. Was it clear what information and data were to be entered into the 13 MCM screens?   Circle: Yes   or   No

   2. For the multiple-choice items, were you able to find suitable responses among the alternatives available?   Circle: Yes   or   No

   3. For the items requiring you to enter text, did you have any problem entering that text information?   Circle: Yes   or   No

   4. Were there any vital issues which should have been entered at this stage of a mission analysis that were not addressed by a SORD probe or to which you could not adequately respond?   Circle: Yes   or   No

   5. Please use the space below to elaborate on any of the responses you gave above.

B. <u>Mission Quantification Module</u>

   1. Did you have any problem choosing a task to quantify?
Circle: Yes   or   No

   2. Was it clear what information and data were to be entered for the 10 different categories of task quantification?   Circle: Yes   or   No

   3. For the items requiring you to enter text, did you have any problem entering that text information?   Circle: Yes   or   No

   4. Were the summary screens for quantitative task information useful?
Circle: Yes   or   No

   5. Were there any vital issues which should have been entered at this stage of a mission analysis that were not addressed by a SORD probe or to which you could not adequately respond?   Circle: Yes   or   No

   6. Please use the space below to elaborate on any of the responses you gave above.

C. Function Determination Module

1. Did you have any problem choosing a task for function determination?
Circle: Yes or No

2. For the function selection screen, were you able to find suitable function names among the 19 alternatives available? Circle: Yes or No

3. For the function specification screens for a given selected function, were you able to find suitable qualitative and quantitative responses among the alternatives available? Circle: Yes or No

4. Were there any vital issues which should have been entered at this stage of a mission analysis that were not addressed by a SORD probe or to which you could not adequately respond? Circle: Yes or No

5. Was the summary screen for functions selected useful?
Circle: Yes or No

6. Please use the space below to elaborate on any of the responses you gave above.

USING THE UNIT DESIGN SUBSYSTEM

A. **Materiel System Identification Module**

    1. Did you have any problem choosing a function for which to identify candidate materiel systems?   Circle: Yes or No

    2. Did you ever use the option to review function specifications before listing candidate materiel systems for the unit?   Circle: Yes or No

    3. If Yes, was the function specification information useful? Circle: Yes or No

    4. Did you have any problem entering the names or descriptions of candidate materiel systems?   Circle: Yes or No

    5. Did you ever alternating between the MSIM and PIM to enter the names of materiel <u>and</u> personnel candidates for one function before moving on to another function?   Circle: Yes or No

    6. Was there any advantage in alternating between MSIM and PIM to identify potential assets for the unit?   Circle: Yes or No

    7. Did you ever identify a candidate materiel system for which you could also identify a crew?   Circle: Yes or No

    8. If Yes, did you go to the Crew Data Base and design a crew for the materiel system?   Circle: Yes or No

    9. Was the summary screen for materiel systems identified useful? Circle: Yes or No

    10. Please use the space below to elaborate on any of the responses you gave above.

B. Personnel Identification Module

1. Did you have any problem choosing a function for which to identify candidate personnel specialties?   Circle: Yes or No

2. Did you ever use the option to review function specifications before listing candidate personnel specialties for the unit?   Circle: Yes or No

3. If Yes, was the function specification information useful? Circle: Yes or No

4. Did you have any problem entering the names or descriptions of candidate personnel specialties?   Circle: Yes or No

5. Did you ever alternating between the MSIM and PIM to enter the names of materiel and personnel candidates for one function before moving on to another function?   Circle: Yes or No [Please answer here even if you already answered the same question in A.5. above.]

6. Was there any advantage in alternating between MSIM and PIM to identify potential assets for the unit?   Circle: Yes or No

7. Did you ever recognize that candidate personnel specialties could be assigned as crew members for a materiel system?   Circle: Yes or No

8. If Yes, did you go to the Crew Data Base and assign these personnel to the crew for the materiel system?   Circle: Yes or No

9. Was the summary screen for personnel specialties identified useful? Circle: Yes or No

10. Please use the space below to elaborate on any of the responses you gave above.

C. <u>Unit Sizing Module</u>

1. Did you have any problem choosing a function to which you would assign materiel or personnel?   Circle: Yes or No

2. Did you ever use the option to review function specifications before assigning materiel or personnel to the unit?   Circle: Yes or No

3. If Yes, was the function specification information useful?
Circle: Yes or No

4. Did you have any problem entering the quantities of materiel or personnel assets required to meet the unit's functional requirements?
Circle: Yes or No

5. When assigning materiel systems to the unit, did you ever specify that the crew for that system was to be obtained from the Crew Data Base?
Circle: Yes or No

6. If Yes, is this a useful feature of SORD?   Circle: Yes or No

7. Did you ever alternate between assigning materiel and assigning personnel to perform a given function when sizing out the unit?
Circle: Yes or No

8. Was there any advantage in alternating between the assignment of materiel and personnel when sizing out the unit?   Circle: Yes or No

9. Instead of separately assigning materiel and personnel assets to the unit, did you ever assign both types of assets to a cell in the Crew Data Base and then assign the cell to the unit?   Circle: Yes or No

10. Was there any advantage in assigning cells rather than separately assigning materiel and personnel assets?   Circle: Yes or No

11. Did you ever use the "Note" screen associated with the materiel and personnel assignment screens?   Circle: Yes or No

12. If Yes, is this a useful feature of SORD?   Circle: Yes or No

13. Were the summary screens for materiel and personnel assets assigned to the unit to meet its functional requirements useful? Circle: Yes or No

14. Please use the space below to elaborate on any of the responses you gave above.

D. <u>C2 & Structure Development Module</u>

    1. Did you have any problem entering the name of a basic, first-level element of the unit?   Circle: Yes or No

    2. Did you have any problem entering the quantities of available materiel or personnel assets that were to be assigned to a basic, first-level element of the unit?   Circle: Yes or No

    3. Were the summary screens for materiel and personnel assets assigned to a basic, first-level element of the unit useful? Circle: Yes or No

    4. Did you have any problem entering the number of times a basic, first-level element was to be duplicate in the unit, or in specifying whether or not you were finished with developing first-level elements?
Circle: Yes or No

    5. Did you have any problem entering the name of a given higher-level element, and then assigning available lower-level elements to it?
Circle: Yes or No

    6. Is the summary screen which presents a graphic diagram of the unit hierarchical structure useful?   Circle: Yes or No

    7. Are the procedures and the screens used for assigning command and control personnel to elements of the unit hierarchy both clear and easy to follow?   Circle: Yes or No

    8. Please use the space below to elaborate on any of the responses you gave above.

E. <u>Constraints Application Module</u>

    1. Did you have any problem entering the number of personnel that had to be eliminated from the unit?   Circle: Yes or No

    2. Before proceeding to eliminate personnel from the unit, did you use the options given to review (a) the unit structure, (b) the quantitative values assigned to the mission essential tasks of the unit, and (c) the required functions of the unit?   Circle: Yes or No

    3. If Yes, was the information provided by these reviews useful? Circle: Yes or No

    4. Was the option to specify quantities of personnel to be <u>considered</u> for elimination a useful alternative to merely identifying quantities to be eliminated?   Circle: Yes or No

    5. Did you ever use the "Note" screens associated with the screens that allowed you to designate personnel to be eliminated or to be considered for elimination?   Circle: Yes or No

    6. If Yes, is this an important feature of SORD?   Circle: Yes or No

    7. Was the procedure to be used for actually eliminating personnel clear?   Circle: Yes or No

    8. Please use the space below to elaborate on any of the responses you gave above.

USING THE DESIGN EVALUATION SUBSYSTEM

    1. Did you have any problem choosing a task to serve as a basis for verifying the adequacy of the unit's design capabilities?
Circle: Yes or No

    2. Is the information presented in the "Verification of Design Requirements" screen useful?   Circle: Yes or No

    3. Is the information presented in the "Verification of Design Requirements" screen presented in a useful format?   Circle: Yes or No

    4. Are the response alternatives available to indicate the outcome of the verification process adequate?   Circle: Yes or No

    5. Did you ever use the "Note" screen associated with the "Verification of Design Requirements" screen? Circle: Yes or No

    6. If Yes, is this an important feature of SORD? Circle: Yes or No

    7. Is the verification action summary screen useful?
Circle: Yes or No

    8. Please use the space below to elaborate on any of the responses you gave above.

USING THE REPORT MODULE

1. Did you have any problem entering necessary information or data for the cover page of the URS?   Circle: Yes   or   No

2. Did you have any problem outputting the URS on the monitor screen? Circle: Yes   or   No

3. Did you have any problem outputting the URS on printer? Circle: Yes   or   No

4. Was the information included in the URS report both necessary and sufficient for your purposes?   Circle: Yes   or   No

5. Was the format of the information in the URS report adequate for your purposes?   Circle: Yes   or   No

6. Please use the space below to elaborate on any of the responses you gave above.

USING THE CREW DATA BASE

1. Did you use the Crew Data Base?   Circle: Yes   or   No

2. If yes, was it difficult to enter crew or cell data into the data base?   Circle: Yes   or   No

3. Please use the space below to elaborate on any of the responses you gave above.

OVERALL EVALUATION OF SORD

1. In your opinion, will SORD affect how much time it will required you to complete the design and documentation of a new unit?   Circle: Yes or No

2. If Yes, will it take more or less time to design and document a new unit using SORD than is currently possible without SORD?
Circle: More or Less

3. If Yes, how much more or less time will it take you to design and document a new unit? Give a multiplier number in the space provided below. (E.g., "0.5" for one-half the time or "2.5" for two and one-half times more time).
Multiplier = _____

4. In your opinion, will SORD affect the thoroughness or comprehensiveness of the design and documentation of a unit?
Circle: Yes or No

5. If Yes, will it be more or less thorough or comprehensive using SORD than is currently possible without SORD?   Circle: More or Less

6. If Yes, how much more or less thorough or comprehensive will the design and documentation be? Give a multiplier number in the space provided below. (E.g., "0.5" for one-half as thorough or "2.5" for two and one-half times more thorough).
Multiplier = _____

7. In your overall opinion will SORD generally affect the unit design and documentation process? Circle: Yes or No

8. If Yes, will SORD generally make the process better or worst than it currently is without SORD?   Circle: More or Less

9. If Yes, how much better or worse will the unit design and documentation process be? Give a multiplier number in the space provided below. (E.g., "0.5" for one-half as good or "2.5" for two and one-half times better).
Multiplier = _____

10. Please use the space below to elaborate on any of the responses you gave above.

WHAT IS YOUR BACKGROUND?

1. How many months and years experience have you in designing and documenting the design of units?

                    _____

2. How many months and years experience do have you in the more general area of organization and personnel systems?

                    _____

3. How many months and years experience do you have in the even more general area of combat development?

                    _____

4. In your opinion, what is the extent of your knowledge in designing and documenting the design of units?

    Minimal|__|__|__|__|__|__|__|__|__|__|Extensive

5. In your opinion, what is the extent of your working knowledge of computers and computer software?

    Minimal|__|__|__|__|__|__|__|__|__|__|Extensive

THANK YOU FOR YOUR EFFORT. YOUR FEEDBACK IS VERY MUCH APPRECIATED

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